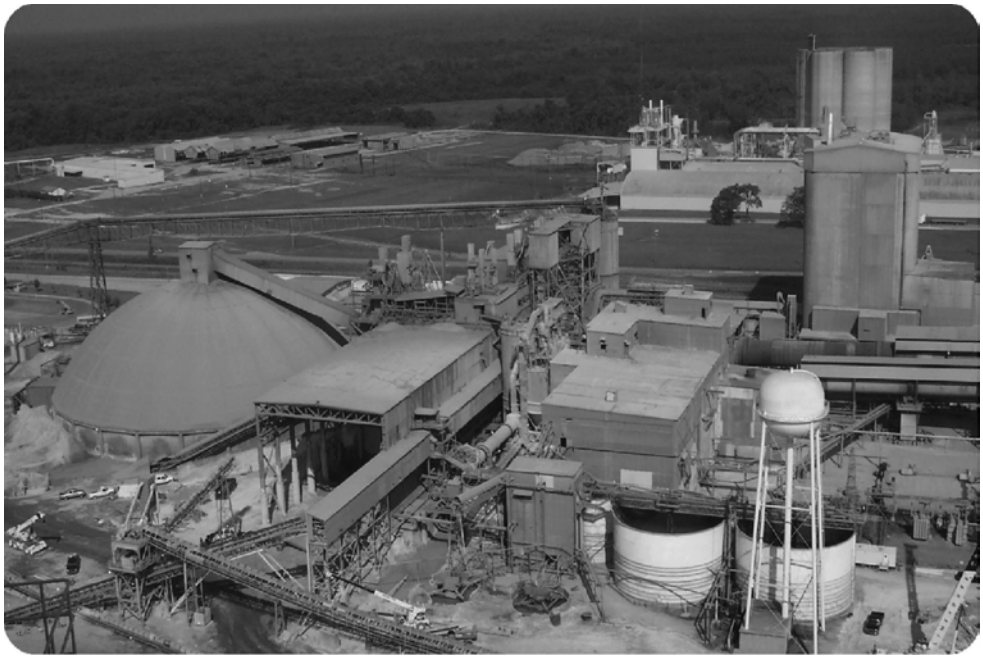
Installation Instructions

Allen-Bradley

PowerFlex 6000 Medium Voltage Variable Frequency Drive Shipping, Handling, and Installation Manual

Publication 6000-IN006B-EN-P



Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

	**WARNING:** Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.
	**ATTENTION:** Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.

Labels may also be on or inside the equipment to provide specific precautions.

	**SHOCK HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.
	**BURN HAZARD:** Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.
	**ARC FLASH HAZARD:** Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

Chapter 6

Drive Electrical Installation (For UL)

Chapter 7

Drive Electrical Interconnection (For IEC)

Notes:

Introduction

This document provides procedural information for physically unloading, moving, and installing PowerFlex® 6000 medium voltage drives.

Who Should Use This Manual

This manual is intended for use by professional riggers, general contractors, electrical contractors, or plant operations personnel familiar with moving and siting heavy equipment. Specific experience with solid-state variable speed drive equipment is NOT required for this part of the installation process, but is mandatory for subsequent processes.

What Is Not in this Manual

This manual provides information specific for physically unloading and situating a PowerFlex 6000 drive. It does not include project-specific, or drive-specific topics such as:

- Dimensional Drawings and Electrical Drawings generated for each customer's order.
- Spare parts lists compiled for each customer's order.
- Drive-specific technical specifications.

Refer to the following documents for additional product detail or instruction relating to PowerFlex 6000 drives:

- PowerFlex 6000 Medium Voltage Variable Frequency Drive Commissioning Manual (6000-IN007_-EN-P): required procedures and checklists for Rockwell Automation Field Service Engineers.
- PowerFlex 6000 Medium Voltage Variable Frequency Drive User Manual (6000-UM001_-EN-P): instructions for daily recurring drive usage, HMI interface and maintenance tasks for the product's end-user.

Required Supplemental Information

This manual includes generic information about the drive cabinet layout orientation and generic electrical connection information.

Review the project-specific Dimensional Drawings (DDs) and Electrical Drawings (EDs) to better understand the specific drive system cabinet orientation and wiring requirements before performing any mechanical or electrical work. Paper copies of the DDs and EDs are placed in the document/hardware box in the Isolation Transformer Cabinet before shipment. Contact the local Rockwell Automation office to obtain digital copies, if required.

If the drive system is supplied with a bypass cabinet, important information is included in the user manual.

Bulletin 6012DB Medium Voltage Bypass Cabinet User Manual (6000-UM002_-EN-P): instructions to connect incoming line and outgoing motor power cables, interconnection of power cables and control wiring between bypass cabinet and drive, and instructions for daily recurring usage and maintenance tasks.

General Precautions

ATTENTION: This drive contains ESD (Electrostatic Discharge) sensitive parts and assemblies. Static control precautions are required when installing, testing, servicing or repairing this assembly. Component damage may result if ESD control procedures are not followed. If you are not familiar with static control procedures, reference Allen-Bradley publication 8000-4.5.2, "Guarding Against Electrostatic Damage" or any other applicable ESD protection handbook.

ATTENTION: An incorrectly applied or installed drive can result in component damage or a reduction in product life. Wiring or application errors, such as, undersizing the motor, incorrect or inadequate AC supply, or excessive ambient temperatures may result in malfunction of the system.

ATTENTION: Only personnel familiar with the PowerFlex 6000 Adjustable Speed Drive (ASD) and associated machinery should plan or implement the installation, start-up and subsequent maintenance of the system. Failure to comply may result in personal injury and/or equipment damage.

Commissioning Support

After installation, Rockwell Automation is responsible for commissioning activities for the PowerFlex 6000 product line. Contact your local Rockwell Automation sales representative to arrange commissioning.

Rockwell Automation support includes, but is not limited to:

- quoting and managing product on-site start-ups
- quoting and managing field modification projects
- quoting and managing product training at Rockwell Automation facilities and on-site

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, http://www.ab.com	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at http:/www.rockwellautomation.com/literature/. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

Contractor Scope of Work

Typical scope of work by the freight company, third-party contractor and/or customer (based on ex-works INCO terms)[1]:

- Load equipment on truck at a Rockwell Automation manufacturing facility and transport equipment to site
- Offload equipment from truck on-site
- Perform initial inspection[2]
- Move equipment to the final installation location
- Position the cabinet sections together as shown in Dimensional Drawing and level the cabinet lineup
- Mechanically join cabinets together
- Affix the cabinets to the floor
- Install assemblies shipped loose (fan assemblies).
  For IEC only – drawout power modules if applicable
- Install external ductwork to exhaust heated air from control room (if required)
- Install power and control cabling and terminate cable connections to drive system:
  - Connect system ground cable[3]
  - Megger test of incoming line and outgoing motor power cables
  - Connect incoming line and outgoing motor power cables[3]
  - Connect control power wiring
  - Connect all external customer required control signal wiring
  - Connect electrical safety interlock control signal wiring circuit to input circuit breaker
- Connecting the power cables and control wiring between cabinets that are shipped separately[4] [5]
- Complete Pre-commissioning Checklist

(1) All or part of these activities could be provided by Rockwell Automation or its representatives, based on contract INCO terms and negotiated scope of supply/services agreement. Contact the local Rockwell Automation office for further information.

(2) Customer should lead the initial inspection process.

(3) If an optional bypass cabinet is supplied, the system ground cable, incoming line power cables, and outgoing motor power cables are connected to the bypass cabinet. Refer to 6012DB Medium Voltage Bypass Cabinet User Manual (6000-UM002_-EN-P).

(4) Additional information about interconnecting the power cables and control wiring for a system including a bypass cabinet is included in the 6012DB Medium Voltage Bypass Cabinet User Manual (6000-UM002_-EN-P).

(5) Interconnection of power cables and low voltage control wiring bundles, between separately shipped cabinets, can be done by the contractor or Rockwell Automation. The commissioning quote from Rockwell Automation reflects this and will contain two options:
a) the base quote, reflecting the power cable and control wiring interconnection work being done by the contractor
b) the optional quote adder, reflecting the additional time and cost for Rockwell Automation to perform the power cable and control wiring interconnection work immediately prior to the commissioning process.

Notes:

Shipping and Handling Procedures (For IEC)

This document pertains to PowerFlex 6000 medium voltage drives and also mentions the optional bypass cabinets. Additional procedures may apply for specific equipment. Refer to other documentation provided with the equipment.

IMPORTANT Chapter 1 contains important information about offloading the drive crates and handling the drive cabinets. Review this chapter before attempting to offload the crates from the delivery truck and move the drive cabinets. The instructions help you safely offload and transport your Rockwell Automation Medium Voltage product to the installation site.

WARNING: Never attempt to lift or move the drive by any means other than the handling methods listed in this publication. Failure to do so may result in personal injury or death, damage to the drive, and potential economic loss.

Overview

The PowerFlex 6000 drive cabinets are bolted to wooden skids and placed into wooden shipping crates. After the crating is removed, the cabinets must remain bolted to the wooden skids until moved to its final installation area. Lifting angles are affixed to the shipping skid on either side of the cabinetry, where applicable. The cabinets must remain in an upright position during handling.

ATTENTION: The load carrying capacity of the lifting device and rigging must be sufficient to safely raise the drive. Check the shipping weights by referring to the container's commercial invoice.

Round rollers can be used to assist in moving the cabinets to the installation site. Once at the final site, the pipe rolling technique can be used to place the cabinet in the desired location.

WARNING: Exercise extreme caution when moving the drive to ensure the equipment is not scratched, dented or damaged in any manner. Stabilize the drive during handling to prevent tipping and injury to personnel.

Any error in transporting or installing the drive will delay the drive commissioning progress.

General Handling Information

- Rockwell Automation strongly recommends using professional riggers with suitable rated lifting equipment to move the drive to the final installation site.
- Qualified professionals must inspect all lifting equipment prior to moving the cabinets.
- Keep the cabinets in an upright position. Some units are top-heavy and may fall over if tilted.
- The cabinets are not rigid structures. Do not torque or twist the cabinets while siting the drives or joining the shipping splits.
- Use fasteners with a minimum metric Grade 10.9 (SAE Grade 8) strength. Rockwell Automation recommends using Crosby bolt-type shackles.
- All lifting cables must meet lifting capacity requirements.
- Close and secure all drive doors before moving the equipment.
- Keep the cabinets bolted to the wooden shipping skids to minimize the possibility of it tipping. Do not remove the wooden skid until the cabinets are at the final installation area. Depending on the type of drive cabinet, the crate may include a pair of lifting angles. Install both lifting angles on top of the cabinet.

ATTENTION: Do not stand near or underneath equipment being lifted overhead.

ATTENTION: Restrict access to areas where equipment will be lifted overhead to prevent access from unauthorized personnel.

Offloading and Moving Crates

Fork Lifts

The terms fork lift, lift truck, and fork lift truck are all commonly used and refer to the same thing. A single fork lift may be used for offloading and moving cabinets up to 4 m (157 in.) wide, if the fork lift has sufficient lifting capacity. Cabinets exceeding 4 m should be offloaded and moved with two fork lifts operating in tandem.

- Insert the forks into the openings of the wooden shipping skid.
- Balance the crates on the forks. The crates can be heavier on one side.
- Use safety straps when handling to steady the crate while moving.

Unpack and Inspect the Drive

Before leaving the factory, all drives have undergone both performance and quality tests. However, damage may occur during the shipping or handling process.

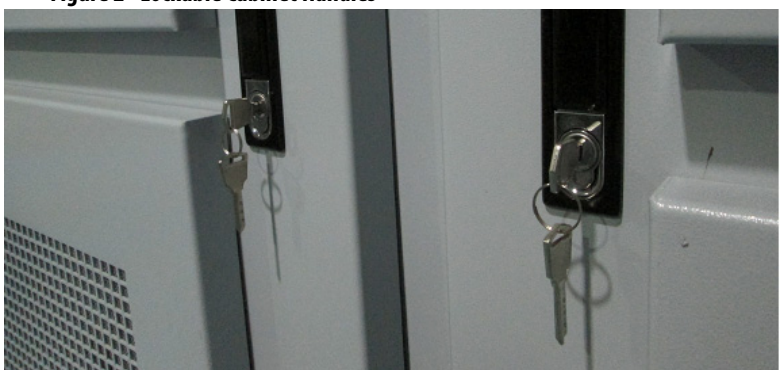
Immediately upon receiving the drive, inspect the crates for signs of damage. After the crates are offloaded, disassemble the crating and check for possible shipping damage. Use a crowbar or other suitable tool to carefully remove the packaging. Do not insert the tool too far into the packaging or damage to the drive cabinet may occur. Inspect the drive cabinets for physical damage according to the Rockwell Automation Conditions of Sale. Open the doors and inspect the major components for signs of damage (Table 2).

Figure 1 - Crated Cabinet

IMPORTANT Any claims for visible breakage or damage must be made to the freight company by the user as soon as possible after receipt of shipment. Rockwell Automation will provide the user with reasonable assistance in the securing of adjustment for such damage claims.

Access to the medium voltage cabinets of the drive is restricted by the use of lockable handles. The cabinet keys are located in the same document/hardware box as the EDs and DDs (see Required Supplemental Information on page 9). The box is accessible through the opening in the cabinet side sheet (without opening a door).

Figure 2 - Lockable Cabinet Handles



Drive Configurations

There are two basic power cell configurations offered in the PowerFlex 6000 product line. For a drive amperage rating ≤200 A, a fixed-mounted power module design is supplied. Fixed-mounted modules are shipped installed in the drive. For a drive amperage rating of >200 A, a drawout power module design is supplied. The drawout power modules are removed from the drive before shipment and shipped in separate crates.

The cabinets may appear slightly different than shown in the illustrations, based on voltage class and whether the drive configuration has fixed-mounted or drawout power modules (see Figure 31 and Figure 32).

Shipment List

The complete shipment will consist of a number of crates, as shown below:

Table 1 - Shipment Configurations

VFD Motor Voltage Class and Amp Rating		Bypass Cabinet (optional)	Isolation Transformer Cabinet(1)	Power Module/ LV Control Cabinet	Power Modules(2)	Power Module Lift Cart(3)	Main Cooling Fans(4)
3/3.3 kV	≤200 A	1 crate	1 crate	1 crate	Fixed-mounted	No	3 fans per crate
	>200 A	1 crate	1 crate	1 crate	Drawout (1 crate)	Yes	3 fans per crate
6/6.6 kV	≤200 A	1 crate	1 crate	1 crate	Fixed-mounted	No	3 fans per crate
	>200 A	1 crate	1 crate	1 crate	Drawout (2 crates)	Yes	3 fans per crate
10 kV	≤200 A	1 crate	1 crate	1 crate	Fixed-mounted	No	3 fans per crate
	>200 A	1 crate	1 crate	1 crate	Drawout (3 crates)	Yes	3 fans per crate

(1) The document/hardware box contains:
- PowerFlex 6000 Medium Voltage Variable Frequency Drive User Manual (6000-UM001_-EN-P)
- PowerFlex 6000 Medium Voltage Variable Frequency Drive Commissioning Manual (6000-IN007_-EN-P)
- PowerFlex 6000 Medium Voltage Bypass Cabinet User Manual (if supplied) (6000-UM002_-EN-P)
- Testing Reports
- Electrical Drawings (EDs) and Dimensional Drawings (DDs)
- Certifications
- All necessary hardware for mounting lifting angles and fan assemblies, and securing the cabinets together.
- Keys for the lockable cabinet handles
- The locking key for drawout power modules, if supplied

(2) Up to nine drawout Power Modules can be shipped in one crate.

(3) The Power Module lift cart is wrapped in plastic for shipment within China, and crated for shipment outside of China.

(4) Refer to Dimensional Drawings or PowerFlex 6000 Dimensions and Weights (For IEC) on page 123 to determine the number of fans/crates.

Initial Inspection Checklist

Table 2 - Shipping Damage Assessment

Bypass Cabinet (if supplied)	Isolation Transformer Cabinet	Power Module Cabinet	Low Voltage Control Cabinet
Low Voltage Door: ❑ Pilot Lights ❑ Voltage Indicator Relay **Cabinet:** ❑ Insulators ❑ Switch assemblies ❑ Vacuum contactors ❑ Mechanical linkages	**Low Voltage Door:** ❑ Transformer Temperature monitor relay **Cabinet:** ❑ Voltage Sensing Board ❑ Incoming Line Power Cable Terminal Insulators ❑ Outgoing Load Power Cable Terminal Insulators ❑ Transformer Secondary Windings – Inspect nomex wrap – Verify windings from core are undamaged – Check for debris in top of core	**Fixed-mounted:** ❑ Power module retaining tabs **Drawout:** ❑ Power Module Support frame ❑ Power modules (shipped in separate crate(s))	**Low Voltage Door:** ❑ Pilot lights ❑ Push buttons ❑ HMI Interface **Panel:** ❑ DIN rail mounted components ❑ UPS ❑ Fiber optic cables ❑ PLC ❑ Control Unit

Storage

Store the drive in a dry, clean and cool area.

The storage temperature must be maintained between -25...55 °C. If the storage temperature fluctuates significantly or if the relative humidity exceeds 90%, use heating and moisture protection devices to prevent condensation.

Store the drive in a conditioned building with adequate air circulation. Do not store the drive outdoors.

Installation Site Requirements

Environmental Conditions

- Elevation above sea level must be less than 1000 m (3250 ft)(1).
- Ambient air temperature must be between 0...40°C (32...104°F)(2).
- Relative humidity must be less than 90%, non-condensing.
- The drive must be installed indoors; there must be no dripping water or other fluids in the room.
- Cooling air must be clean without significant concentrations of sand, corrosive or conductive dust (defined by IEC 721-1 as being less than 0.2 mg/m^3 of dust), or explosive gas.
- Free from significant vibration.
- The drive must be anchored on a level floor. Please refer to the dimension drawing for the anchor point sizes and locations.

For the equipment to operate in conditions other than those specified, consult the local Rockwell Automation Sales Office.

(1) Options are available for operation up to 3000 m.a.s.l. However, these must be stated at the time of order and cannot be retrofitted in the field.

(2) Options are available for ambient temperatures up to 50 °C. However, these must be stated at the time of order and cannot be retrofitted in the field.

Mounting Clearance Distance

Install the drive with appropriate clearance distances on all sides to ensure proper operation and allow maintenance of the drive.

Table 3 - Minimum Mounting Clearance Distances

Location	Minimum Distance Required, approx.
In Front	• 1500 mm (60 in.)
Behind	• 1000 mm (39 in.)
Above(1)	• 400 mm (16 in.) without ducting requirements • 1000 mm (39 in.) with ducting requirements

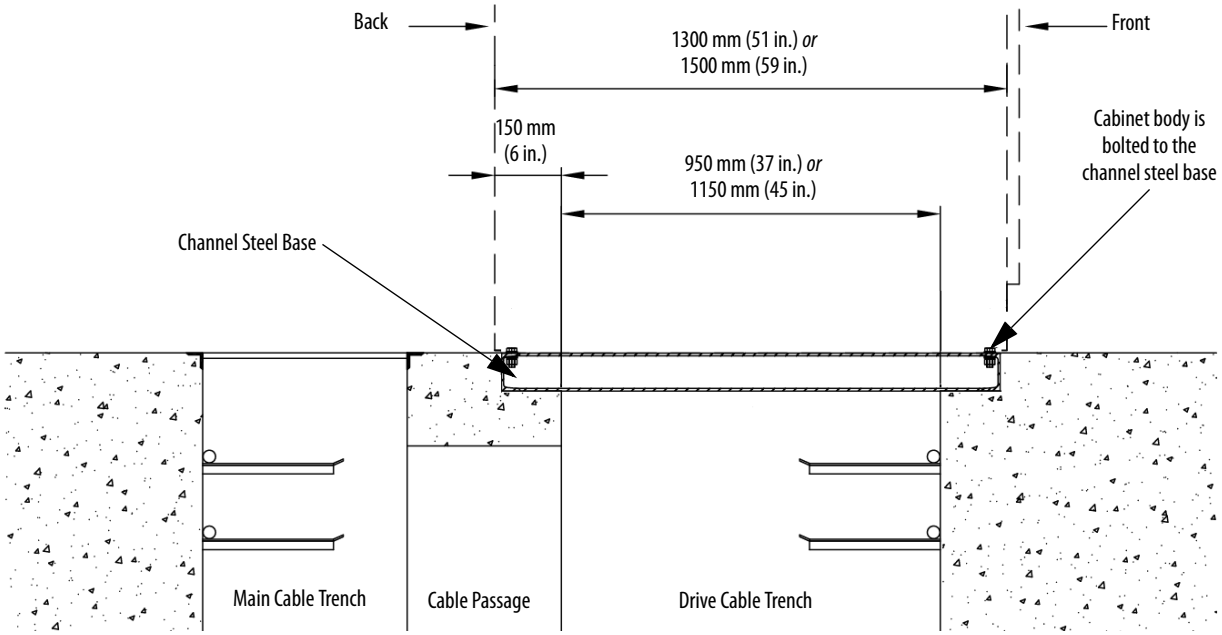
(1) Distance above is measured from the top plate of the drive cabinet (excludes height of fan housing).

ATTENTION: An incorrectly applied or installed drive can result in component damage or reduction in product life. Ambient conditions not within the specified ranges may result in malfunction of the drive.

Mounting Requirements

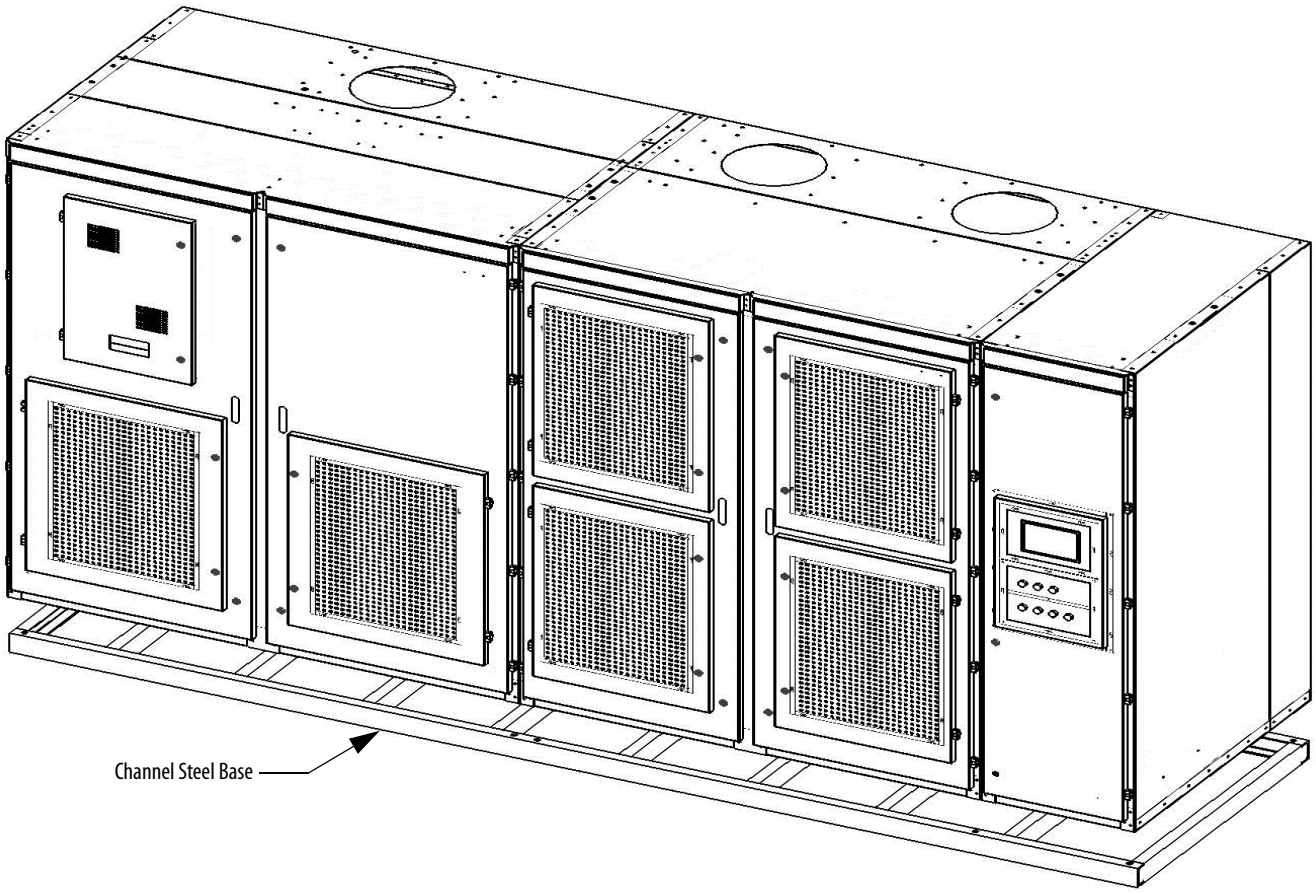
The base must be smooth, flat and level. If power cabling is entering from below, and a cable trench system is used, refer to Figure 3. The base structure of the drive cabinet may be constructed with #10 channel steel, approximately 100 x 48 x 5.3 mm (3.9 x 1.9 x 0.2 in.). Dimension pairs reflect the 1300 mm or 1500 mm deep cabinet configurations and the corresponding Drive Cable Trench depth.See PowerFlex 6000 Dimensions and Weights (For IEC) on page 123.

Figure 3 - A typical cross-sectional view of the trench system



Embed the channel steel base profile in the base with its top surface flush with ground level, or protruding slightly above ground level.

Figure 4 - Channel Steel Base Location



Bolt or weld the drive cabinet on the profile steel base (Refer to Affix Cabinets to Floor on page 48). A reliable connection must be made between the steel base and the cabinet. The steel base profile shall be reliably grounded.

Moving with Rod or Pipe Rollers

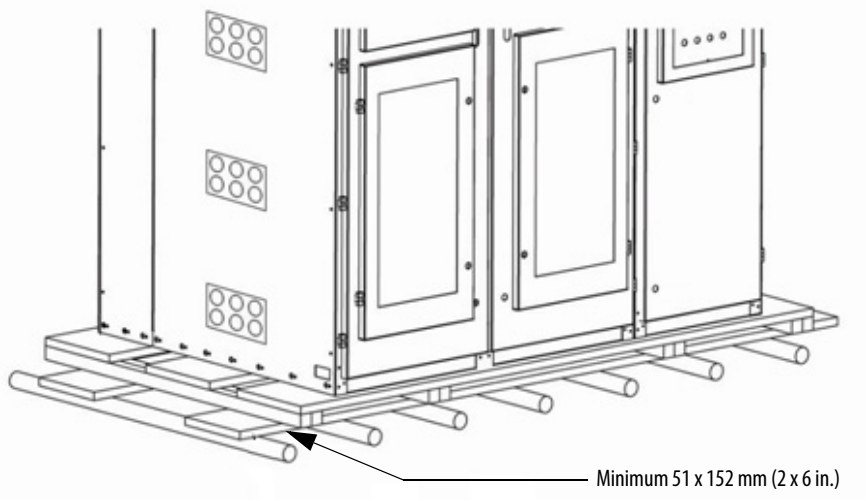
This method is only suitable when there are no inclines and the drive is moved on the same floor.

Boards with cross section of about 50 ×150 mm (2 × 6 in.) and length of at least 300 mm (12 in.) longer than the drive must be placed under the wooden skid.

Lift the cabinet and carefully and slowly lower the drive cabinet onto the roller pipes until the drive weight is borne on the roller pipes. Do not remove the shipping skid; the skid is required for this process (Refer to Attach the Overhead Lifting Cables on page 22).

Roll the drive to its destination location. Steady the cabinet to prevent tipping.

Figure 5 - Rod or Pipe Rollers

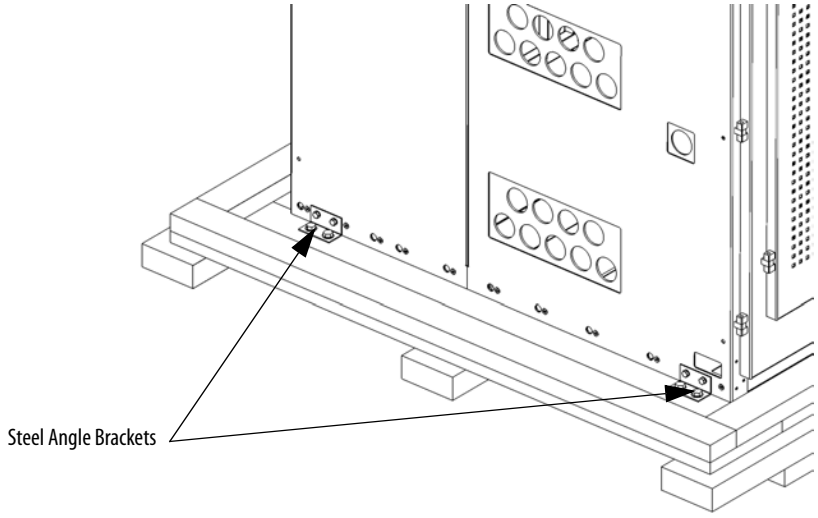


Remove the Wooden Skids

Remove the wooden shipping skids when the drive is in its final installation location. Steel angle brackets bolt the cabinet to the wooden shipping skid. Remove this hardware, lift the cabinets off the skids, and remove the skids from underneath.

Refer to Lift the Power Module/LV Control Cabinet on page 21 and Lift the Isolation Transformer Cabinet on page 25.

Figure 6 - Angle Brackets



Overhead Lifting Methods

The preferred method of lifting the cabinets is an overhead crane. If overhead lifting with a crane is not available, use a fork lift with a capacity greater than the cabinet weight. Lift the cabinet using the overhead lifting angles or isolation transformer lifting provisions and suitable spreader bars and rigging attached to the fork lift.

IMPORTANT Close and lock the cabinet doors before moving any cabinets.

Lift the Power Module/LV Control Cabinet

Two lifting angles are used for the Power Module/LV Control Cabinet and are affixed to either side of the shipping skid.

The length of the lifting angles depends on the length of the Power Module/LV Control Cabinet.

Table 4 - Lifting Angles

Length, approx.	Dimensions, approx.	Weight per Angle, approx.
1.2 m (3.9 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	13.1 kg (29 lb)
2.0 m (6.6 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	21.9 kg (48 lb)
2.4 m (7.9 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	26.3 kg (58 lb)
3.5 m (11.6 ft)	125 x 80 x 10 mm (4.9 x 3.1 x 0.39 in.)	54.6 kg (120 lb)
4.2 m (13.6 ft)	125 x 80 x 10 mm (4.9 x 3.1 x 0.39 in.)	64.1 kg (141 lb)
4.9 m (16.1 ft)	125 x 80 x 10 mm (4.9 x 3.1 x 0.39 in.)	75.8 kg (167 lb)

Install the Lifting Angles

IMPORTANT Label and retain all lifting-related hardware if the drive system may be moved in the future.

ATTENTION: Failure to install the pair of lifting angles prior to moving the drive may result in personal injury and/or equipment damage.

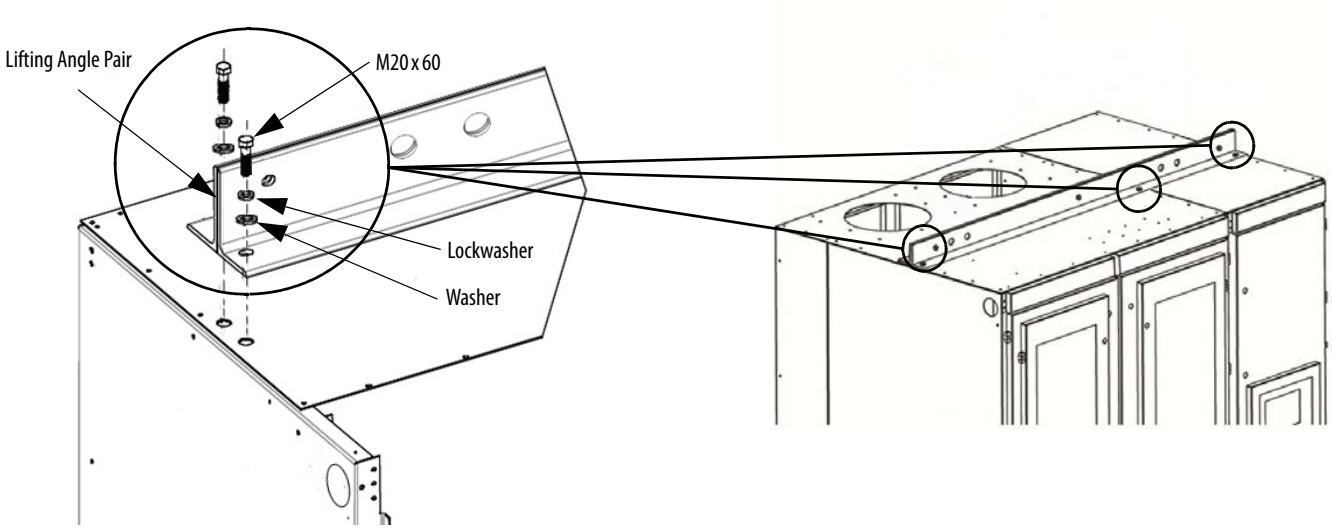
The lifting angles hold the Power Module/LV Control cabinets together to prevent separation and damage while riggers move the drive to the final installation area.

The lifting angles are shipped with the Power Module/LV Control Cabinet and must be secured before lifting the cabinet.

1. Remove the lifting angles from the skid.
2. Remove the attachment hardware that is pre-installed in the mounting holes in the cabinet top plate before shipment.

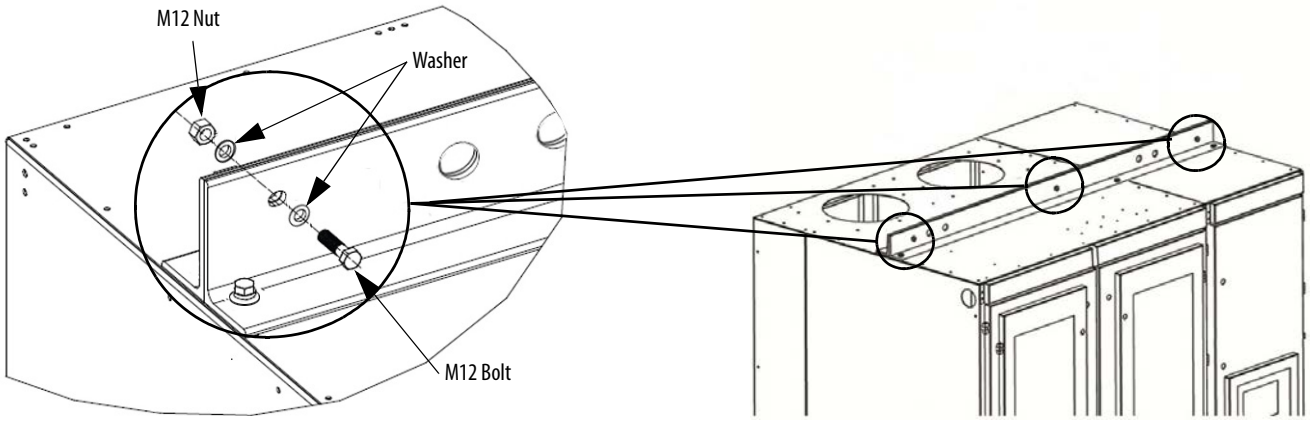
3. Align and secure the lifting angles in six places as shown in Figure 7 using the hardware removed in step 2.

Figure 7 - Install Fasteners from the Lifting Angles to the Drive in six places



4. Install the supplied hardware (M12 bolt and nut, two flat washers) to join the lifting angles together in three places (Figure 8).

Figure 8 - Bolt vertical slots on the Lifting Angles in three places



Attach the Overhead Lifting Cables

1. Attach rigging assembly firmly to the lifting angles on the top of the Power Module/LV Control Cabinet (Figure 9).

ATTENTION: The load carrying capacity of the lifting device and rigging must be sufficient to safely raise the cabinet. Check the shipping weights by referring to the container's commercial invoice.

ATTENTION: Do not pass cables through the support holes in the lifting angles. Use slings with safety hooks or shackles.

2. Adjust the rigging lengths to compensate for any unequal weight distribution of load.

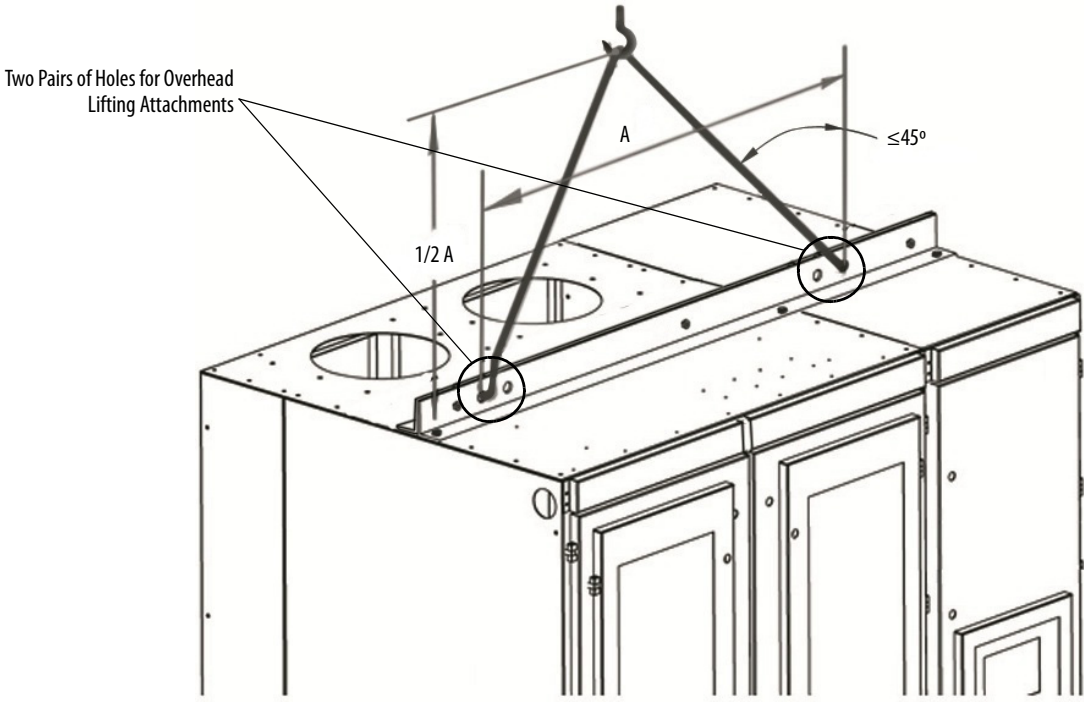
   TIP There are pairs of holes to attach lifting cables on either end of the lifting angle. Generally use the outside holes on either end for the greatest stability. The inner holes could be used to adjust for the cabinet's center of gravity.

   The cabinet must remain in an upright position.

To reduce the tension on the rigging and the compressive load on the lifting device, do not allow the angle between the lifting cables and vertical to exceed 45° (Figure 9).

ATTENTION: Do not tilt the drive.

Figure 9 - Overhead Lifting (Power Module/LV Control Cabinet)



3. Remove the steel angle brackets bolting the cabinet to the skid.

4. Lift the cabinet using overhead lifting angles and remove the wooden shipping skid from under the equipment.

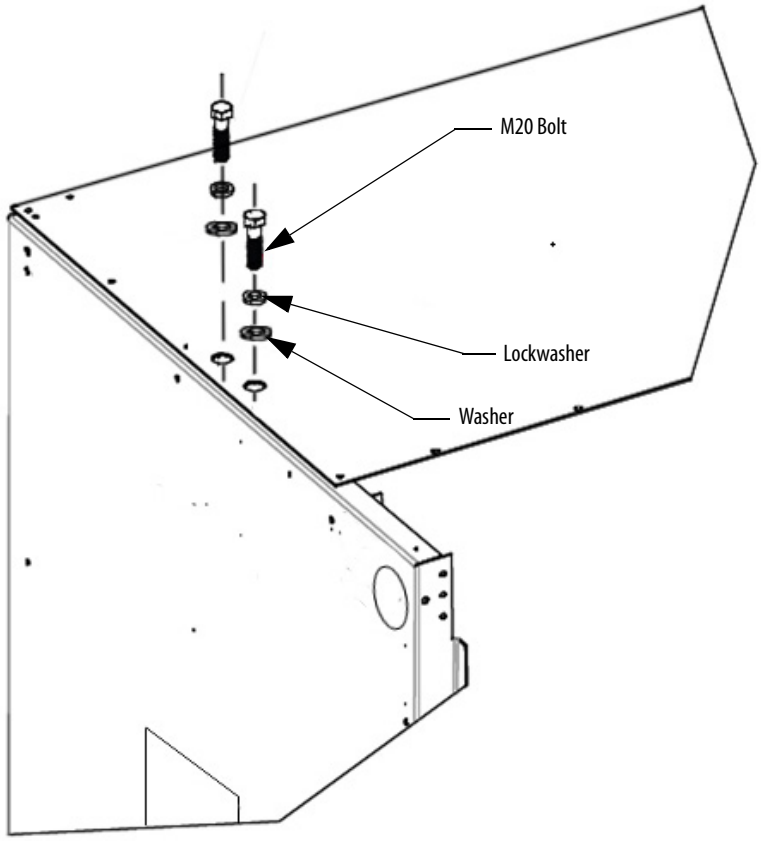
ATTENTION: Only lift the cabinet high enough to remove the shipping skid at this point. Do not place any parts of the body underneath the cabinet. Remove the shipping skid from the work area before continuing.

Remove Overhead Lifting Cables and Lifting Angles

When the cabinet is in the desired position, remove the lifting angles.

1. Remove rigging from the lifting angles, and remove the bolts holding the lifting angles together; retain or recycle hardware.
2. Remove and retain the hardware from the base of the lifting angles and retain or recycle the lifting angles.
3. Reinstall the hardware (M20 x 60) removed in step 2 (to seal the holes) on the top of the drive (Figure 10).

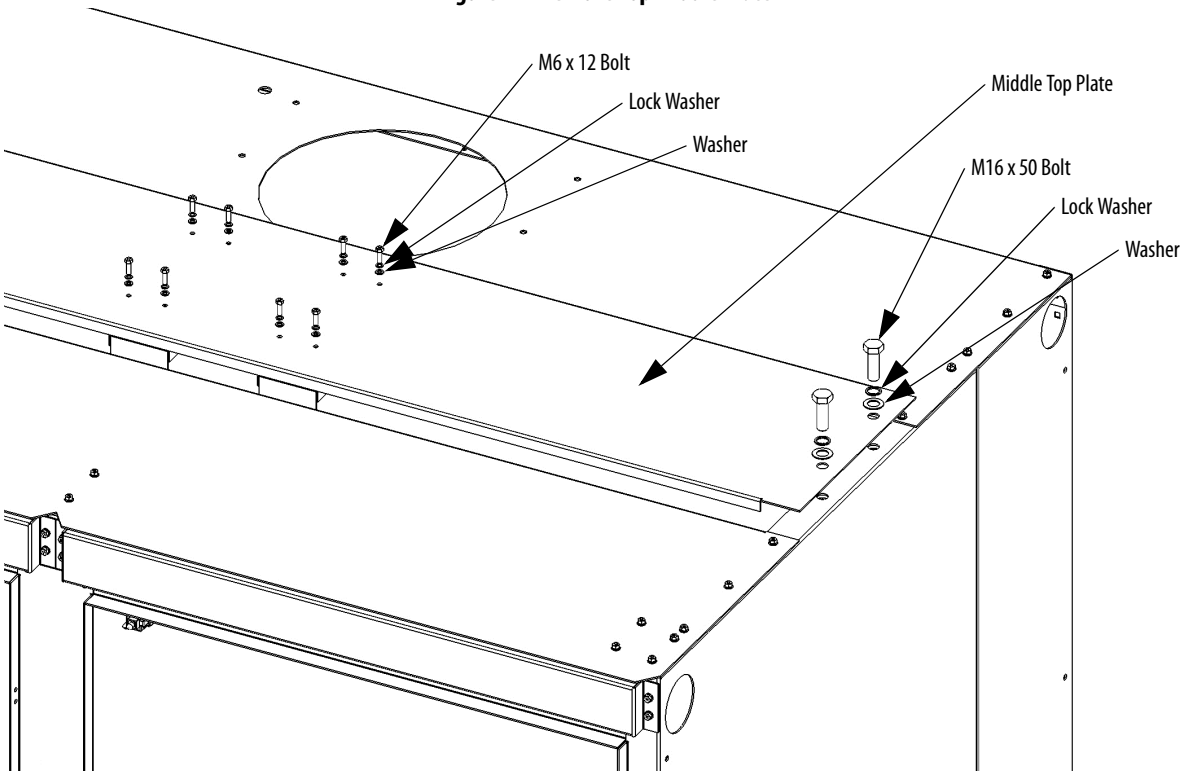
Figure 10 - Insert bolts



Lift the Isolation Transformer Cabinet

1. Unfasten and remove the middle top plate on top of the cabinet, and retain middle top plate and hardware.

Figure 11 - Remove Top Middle Plate



The cabinet version with a single main cooling fan will have two support brackets. The cabinet version with two fans will have three support brackets.

Most configurations have one or two top-mounted main cooling fans in the isolation transformer cabinet. However, high power configurations can have more.

Figure 12 - Isolation Transformer with one Fan Assembly (Overhead view)

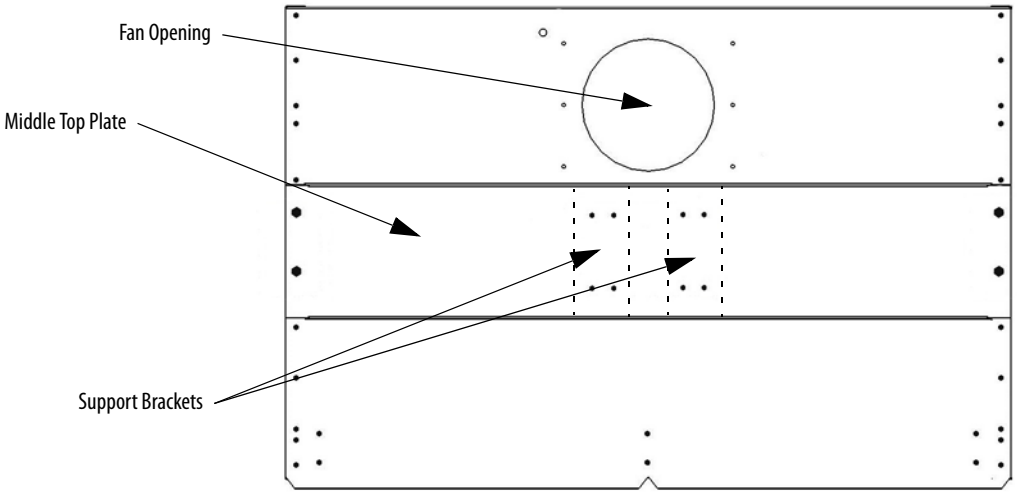
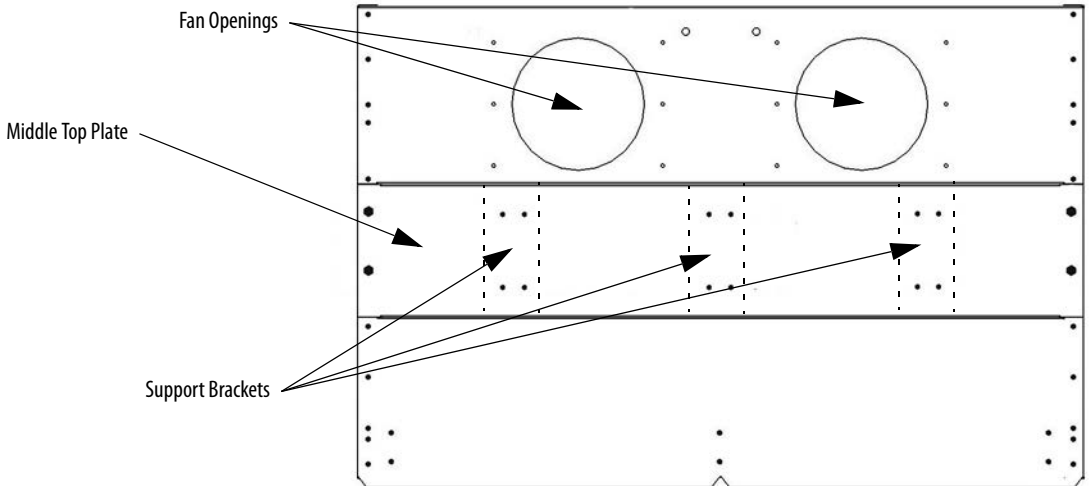


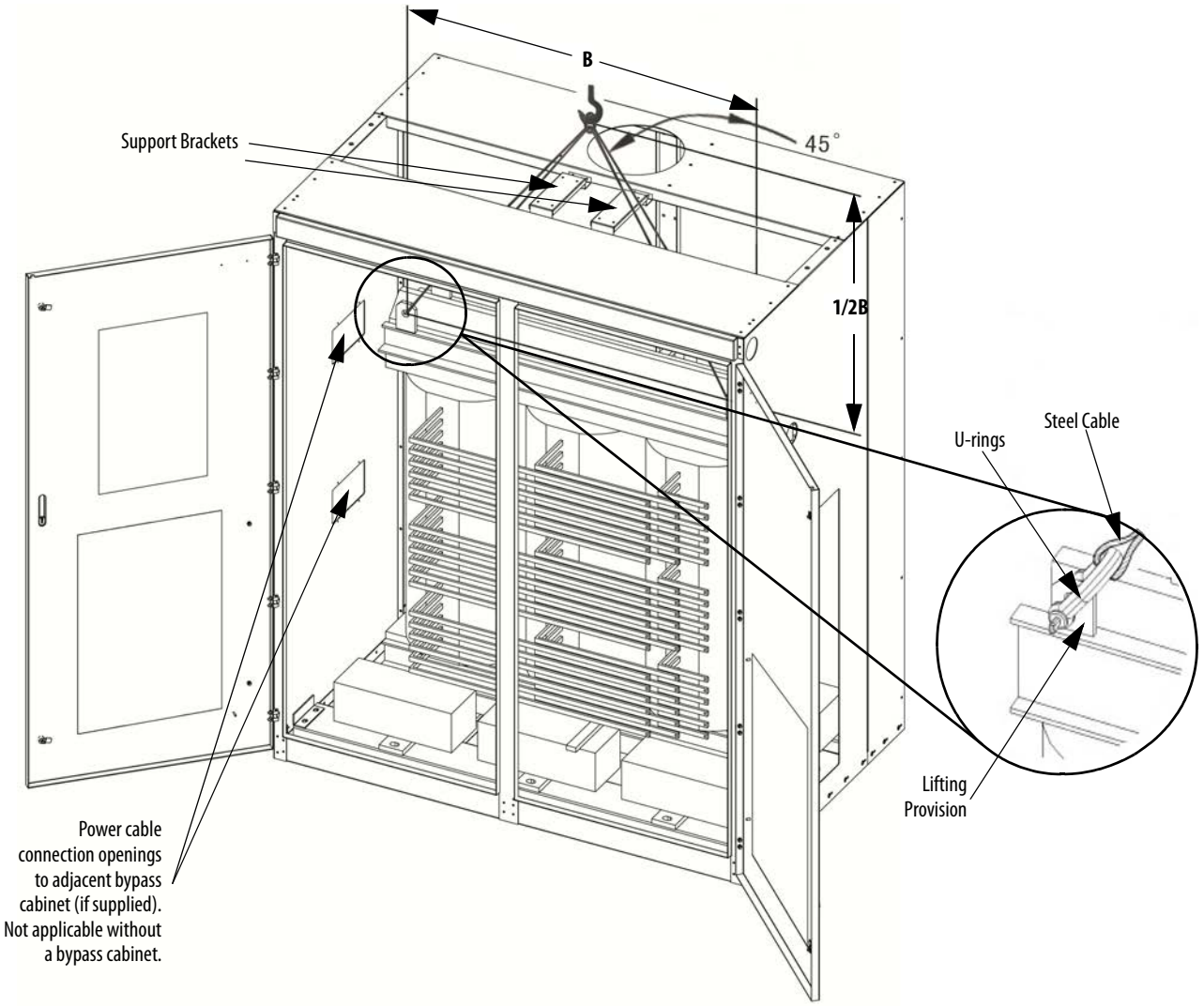
Figure 13 - Isolation Transformer with two Fan Assemblies (Overhead view)



2. Attach the steel cable to the U-ring attachments (Figure 14), ensuring the cables pass freely though the center section of the cabinet and that they do not contact the middle top plate support brackets.

3. Attach the U-ring attachments to the lifting provisions on the isolation transformer.

Figure 14 - Overhead Lifting (Isolation Transformer Cabinet)



ATTENTION: The cabinet is attached to the base of the isolation transformer. The cabinet is designed to be lifted only by the isolation transformer lifting provisions. Do not attach cables to the Isolation Transformer cabinet.

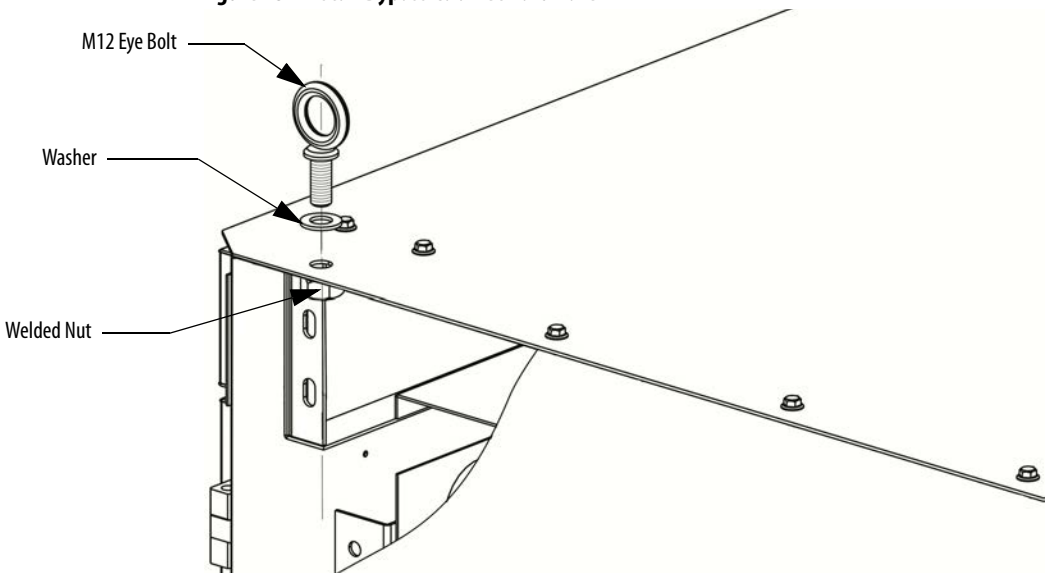
ATTENTION: Keep the weight of the isolation transformer centered when lifting. It is recommended to use the four lifting provisions at all corners of the isolation transformer. Alternatively, the two lifting provisions diagonally opposed could be used.

Lift the Bypass Cabinet

If the optional Bypass Cabinet is supplied, lift the Bypass Cabinet using four M12 eye bolts. The back plate does not have to be removed to install the M12 nuts as they are welded to the inside of the top plate. Refer to Torque Requirements on page 119 for appropriate torque requirements.

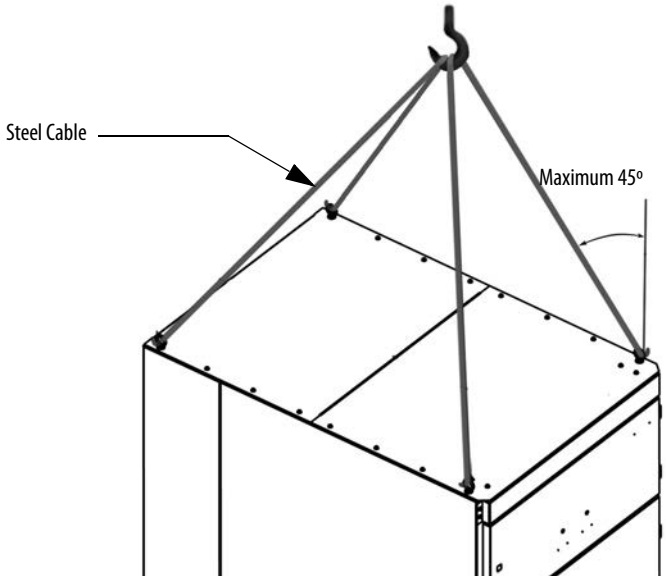
1. Install four M12 eye bolts and washers in each corner of the top plate on the cabinet.

Figure 15 - Install Bypass Cabinet hardware



2. Attach a steel cable or other suitable lifting rigging to the eye bolts. The lifting rigging must meet lifting capacity requirements.

Figure 16 - Lift Bypass Cabinet



3. When the cabinet is in the desired position, remove the steel cable, and hardware.
4. Replace the eye bolts with four M12 bolts and washers provided in the document/hardware box.

Shipping and Handling Procedures (For UL)

This document pertains to PowerFlex 6000 medium voltage drives and also mentions the optional bypass cabinets. Additional procedures may apply for specific equipment. Refer to other documentation provided with the equipment.

IMPORTANT Chapter 1 contains important information about offloading the drive crates and handling the drive cabinets. Review this chapter before attempting to offload the crates from the delivery truck and move the drive cabinets. The instructions help you safely offload and transport your Rockwell Automation Medium Voltage product to the installation site.

WARNING: Never attempt to lift or move the drive by any means other than the handling methods listed in this publication. Failure to do so may result in personal injury or death, damage to the drive, and potential economic loss.

Overview

The PowerFlex 6000 drive cabinets are bolted to wooden skids and placed into wooden shipping crates. After the crating is removed, the cabinets must remain bolted to the wooden skids until moved to its final installation area. Lifting angles are affixed to the shipping skid on either side of the cabinetry, where applicable. The cabinets must remain in an upright position during handling.

ATTENTION: The load carrying capacity of the lifting device and rigging must be sufficient to safely raise the drive. Check the shipping weights by referring to the container's commercial invoice.

Round rollers can be used to assist in moving the cabinets to the installation site. Once at the final site, the pipe rolling technique can be used to place the cabinet in the desired location.

WARNING: Exercise extreme caution when moving the drive to ensure the equipment is not scratched, dented or damaged in any manner. Stabilize the drive during handling to prevent tipping and injury to personnel.

Any error in transporting or installing the drive will delay the drive commissioning progress.

General Handling Information

- Rockwell Automation strongly recommends using professional riggers with suitable rated lifting equipment to move the drive to the final installation site.
- Qualified professionals must inspect all lifting equipment prior to moving the cabinets.
- Keep the cabinets in an upright position. Some units are top-heavy and may fall over if tilted.
- The cabinets are not rigid structures. Do not torque or twist the cabinets while siting the drives or joining the shipping splits.
- Use fasteners with a minimum metric Grade 10.9 (SAE Grade 8) strength. Rockwell Automation recommends using Crosby bolt-type shackles.
- All lifting cables must meet lifting capacity requirements.
- Close and secure all drive doors before moving the equipment.
- Keep the cabinets bolted to the wooden shipping skids to minimize the possibility of it tipping. Do not remove the wooden skid until the cabinets are at the final installation area. Depending on the type of drive cabinet, the crate may include a pair of lifting angles. Install both lifting angles on top of the cabinet.

ATTENTION: Do not stand near or underneath equipment being lifted overhead.

ATTENTION: Restrict access to areas where equipment will be lifted overhead to prevent access from unauthorized personnel.

Offloading and Moving Crates

Fork Lifts

The terms fork lift, lift truck, and fork lift truck are all commonly used and refer to the same thing. A single fork lift may be used for offloading and moving cabinets up to 4 m (157 in.) wide, if the fork lift has sufficient lifting capacity. Cabinets exceeding 4 m should be offloaded and moved with two fork lifts operating in tandem.

- Insert the forks into the openings of the wooden shipping skid.
- Balance the crates on the forks. The crates can be heavier on one side.
- Use safety straps when handling to steady the crate while moving.

Unpack and Inspect the Drive

Before leaving the factory, all drives have undergone both performance and quality tests. However, damage may occur during the shipping or handling process.

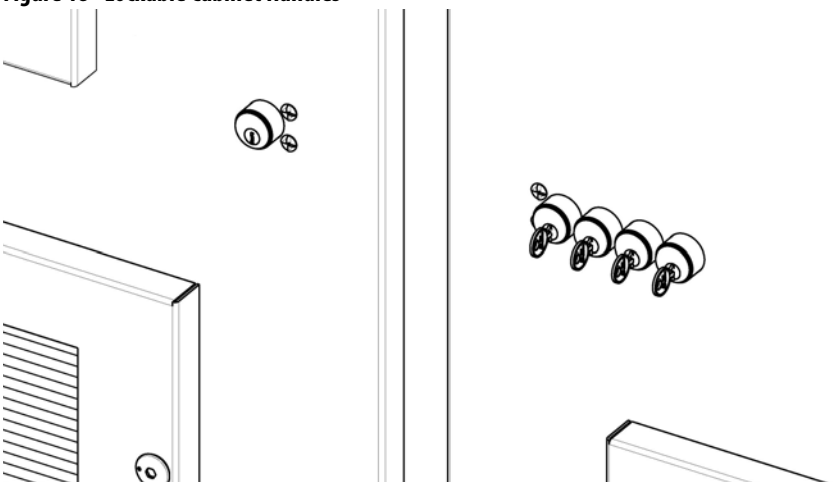
Immediately upon receiving the drive, inspect the crates for signs of damage. After the crates are offloaded, disassemble the crating and check for possible shipping damage. Use a crowbar or other suitable tool to carefully remove the packaging. Do not insert the tool too far into the packaging or damage to the drive cabinet may occur. Inspect the drive cabinets for physical damage according to the Rockwell Automation Conditions of Sale. Open the doors and inspect the major components for signs of damage (Table 6).

Figure 17 - Crated Cabinet

IMPORTANT Any claims for visible breakage or damage must be made to the freight company by the user as soon as possible after receipt of shipment. Rockwell Automation will provide the user with reasonable assistance in the securing of adjustment for such damage claims.

Access to the medium voltage cabinets of the drive is restricted by the use of lockable handles. The cabinet keys are located in the same document/hardware box as the EDs and DDs (see Required Supplemental Information on page 9). The box is accessible through the opening in the cabinet side sheet (without opening a door).

Figure 18 - Lockable Cabinet Handles



Drive Configurations

There are two basic power cell configurations offered in the PowerFlex 6000 product line. For a drive amperage rating ≤ 200 A, a fixed-mounted power module design is supplied. Fixed-mounted modules are shipped installed in the drive.

The cabinets may appear slightly different than shown in the illustrations, based on voltage class (see Figure 40).

Shipment List

The complete shipment will consist of a number of crates, as shown below:

Table 5 - Shipment Configurations

VFD Motor Voltage Class and Amp Rating	Bypass Cabinet (optional)	Isolation Transformer Cabinet(1)	Power Module/ LV Control Cabinet	Power Modules	Power Module Lift Cart(2)
2.3/2.4 kV	1 crate	1 crate	1 crate	Fixed-mounted	No
4.0/4.16 kV	1 crate	1 crate	1 crate	Fixed-mounted	No
6.0 kV	1 crate	1 crate	1 crate	Fixed-mounted	No
6.3 kV	1 crate	1 crate	1 crate	Fixed-mounted	No
6.6 kV	1 crate	1 crate	1 crate	Fixed-mounted	No

(1) The document/hardware box contains:
- PowerFlex 6000 Medium Voltage Variable Frequency Drive User Manual (6000-UM001_-EN-P)
- PowerFlex 6000 Medium Voltage Variable Frequency Drive Commissioning Manual (6000-IN007_-EN-P)
- PowerFlex 6000 Medium Voltage Bypass Cabinet User Manual (if supplied) (6000-UM002_-EN-P)
- Testing Reports
- Electrical Drawings (EDs) and Dimensional Drawings (DDs)
- Certifications
- All necessary hardware for mounting lifting angles and fan assemblies, and securing the cabinets together.
- Keys for the lockable cabinet handles

(2) The Power Module lift cart is wrapped in plastic for shipment within China, and crated for shipment outside of China.

Initial Inspection Checklist

Table 6 - Shipping Damage Assessment

Isolation Transformer Cabinet	Power Module Cabinet	Low Voltage Control Cabinet
Low Voltage Door: ❑ Transformer Temperature monitor relay **Cabinet:** ❑ Voltage Sensing Board ❑ Incoming Line Power Cable Terminal Insulators ❑ Outgoing Load Power Cable Terminal Insulators ❑ Transformer Secondary Windings – Inspect nomex wrap – Verify windings from core are undamaged – Check for debris in top of core	**Fixed-mounted:** ❑ Power module retaining tabs	**Low Voltage Door:** ❑ Pilot lights ❑ Push buttons ❑ HMI Interface **Panel:** ❑ DIN rail mounted components ❑ UPS ❑ Fiber optic cables ❑ PLC ❑ Control Unit

Storage

Store the drive in a dry, clean and cool area.

The storage temperature must be maintained between -25...55 °C (-13....131 °F). This temperature rating applies only to the drive, it does not include the UPS (uninterruptible power supply). If the storage temperature fluctuates significantly or if the relative humidity exceeds 90%, use heating and moisture protection devices to prevent condensation.

Store the drive in a conditioned building with adequate air circulation. Do not store the drive outdoors.

Installation Site Requirements

Environmental Conditions

- Elevation above sea level must be less than 1000 m (3250 ft)(1).
- Ambient air temperature must be between 0...40 °C (32...104 °F)(2).
- Relative humidity must be less than 90%, non-condensing.
- The drive must be installed indoors; there must be no dripping water or other fluids in the room.
- Cooling air must be clean without significant concentrations of sand, corrosive or conductive dust, or explosive gas.
- Free from significant vibration.
- The drive must be anchored on a level floor. Please refer to the dimension drawing for the anchor point sizes and locations.

For the equipment to operate in conditions other than those specified, consult the local Rockwell Automation Sales Office.

(1) Options are available for operation up to 3000 m.a.s.l. However, these must be stated at the time of order and cannot be retrofitted in the field.

(2) Options are available for ambient temperatures up to 50 °C (122 °F). However, these must be stated at the time of order and cannot be retrofitted in the field.

Mounting Clearance Distance

Install the drive with appropriate clearance distances on all sides to ensure proper operation and allow maintenance of the drive.

Table 7 - Minimum Mounting Clearance Distances

Location	Minimum Distance Required, approx.
In Front	• 1500 mm (60 in.)
Behind	• 1000 mm (39 in.)
Above[1]	• 1000 mm (39 in.)

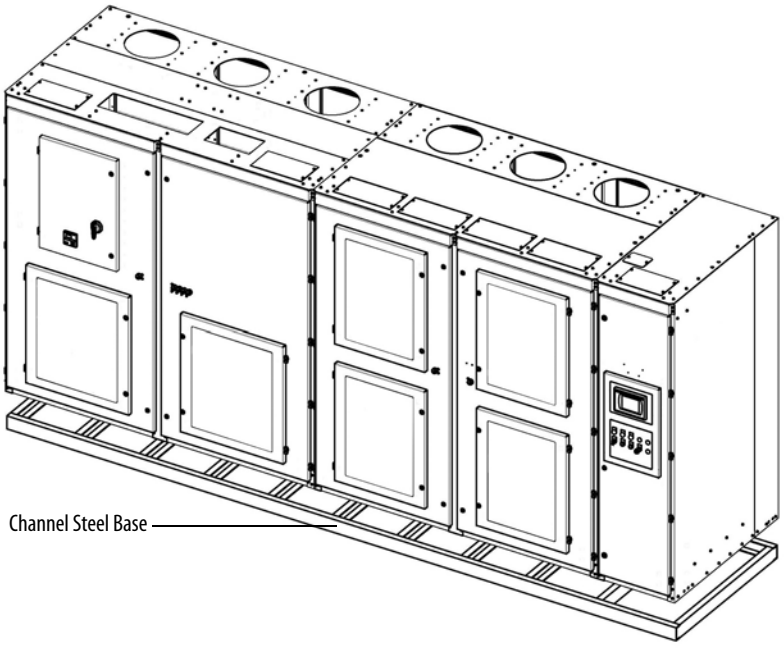
(1) Distance above is measured from the top plate of the drive cabinet (excludes height of fan housing).

ATTENTION: An incorrectly applied or installed drive can result in component damage or reduction in product life. Ambient conditions not within the specified ranges may result in malfunction of the drive.

Mounting Requirements

The base must be smooth, flat and level. The base structure of the drive cabinet may be constructed with #10 channel steel, approximately 100 x 48 x 5.3 mm (3.9 x 1.9 x 0.2 in.). Dimension pairs reflect the 1300 mm deep cabinet configuration and the corresponding Drive Cable Trench depth. See PowerFlex 6000 Dimensions and Weights (For UL) on page 131.

Figure 19 - Channel Steel Base Location



Bolt or weld the drive cabinet on the profile steel base (See Affix Cabinets to Floor on page 62). A reliable connection must be made between the steel base and the cabinet. The steel base profile shall be reliably grounded.

Moving with Rod or Pipe Rollers

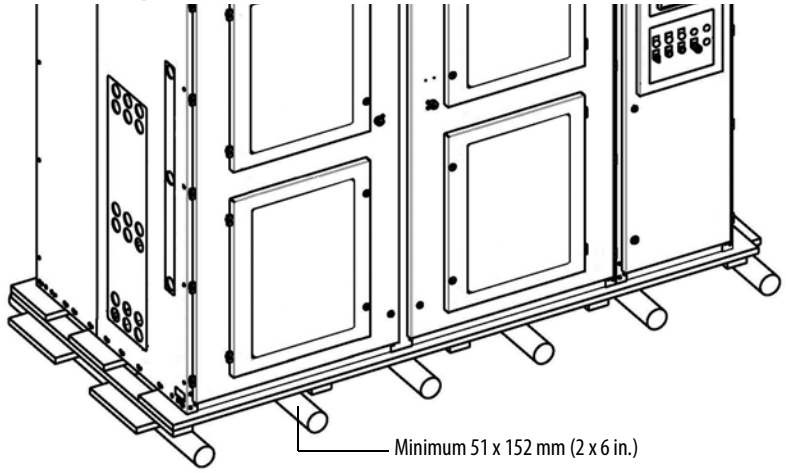
This method is only suitable when there are no inclines and the drive is moved on the same floor.

Boards with cross section of about 50 ×150 mm (2 × 6 in.) and length of at least 300 mm (12 in.) longer than the drive must be placed under the wooden skid.

Lift the cabinet and carefully and slowly lower the drive cabinet onto the roller pipes until the drive weight is borne on the roller pipes. Do not remove the shipping skid; the skid is required for this process (See Attach the Overhead Lifting Cables on page 38).

Roll the drive to its destination location. Steady the cabinet to prevent tipping.

Figure 20 - Rod or Pipe Rollers

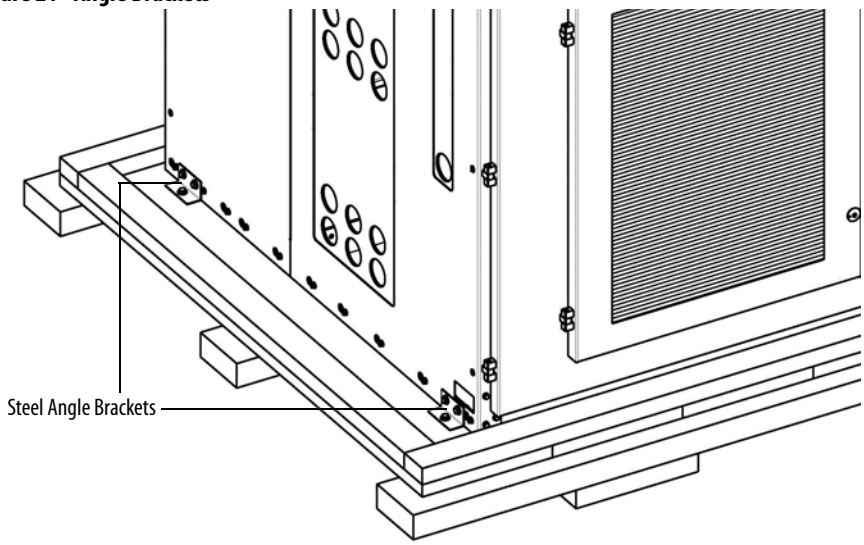


Remove the Wooden Skids

Remove the wooden shipping skids when the drive is in its final installation location. Steel angle brackets bolt the cabinet to the wooden shipping skid. Remove this hardware, lift the cabinets off the skids, and remove the skids from underneath.

Refer to Lift the Power Module/LV Control Cabinet on page 36 and Lift the Isolation Transformer Cabinet on page 40.

Figure 21 - Angle Brackets



Overhead Lifting Methods

The preferred method of lifting the cabinets is an overhead crane. If overhead lifting with a crane is not available, use a fork lift with a capacity greater than the cabinet weight. Lift the cabinet using the overhead lifting angles or isolation transformer lifting provisions and suitable spreader bars and rigging attached to the fork lift.

IMPORTANT Close and lock the cabinet doors before moving any cabinets.

Lift the Power Module/LV Control Cabinet

Two lifting angles are used for the Power Module/LV Control Cabinet and are affixed to either side of the shipping skid.

The length of the lifting angles depends on the length of the Power Module/LV Control Cabinet.

Table 8 - Lifting Angles

Length, approx.	Dimensions, approx.	Weight per Angle, approx.
1.55 m (5.08 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	17.0 kg (37 lb)
1.79 m (5.87 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	19.6 kg (43 lb)
2.18 m (7.15 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	23.9 kg (53 lb)
2.32 m (7.61 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	25.4 kg (56 lb)
2.80 m (9.19 ft)	100 x 80 x 8 mm (3.9 x 3.1 x 0.32 in.)	30.6 kg (67 lb)

Install the Lifting Angles

IMPORTANT Label and retain all lifting-related hardware if the drive system may be moved in the future.

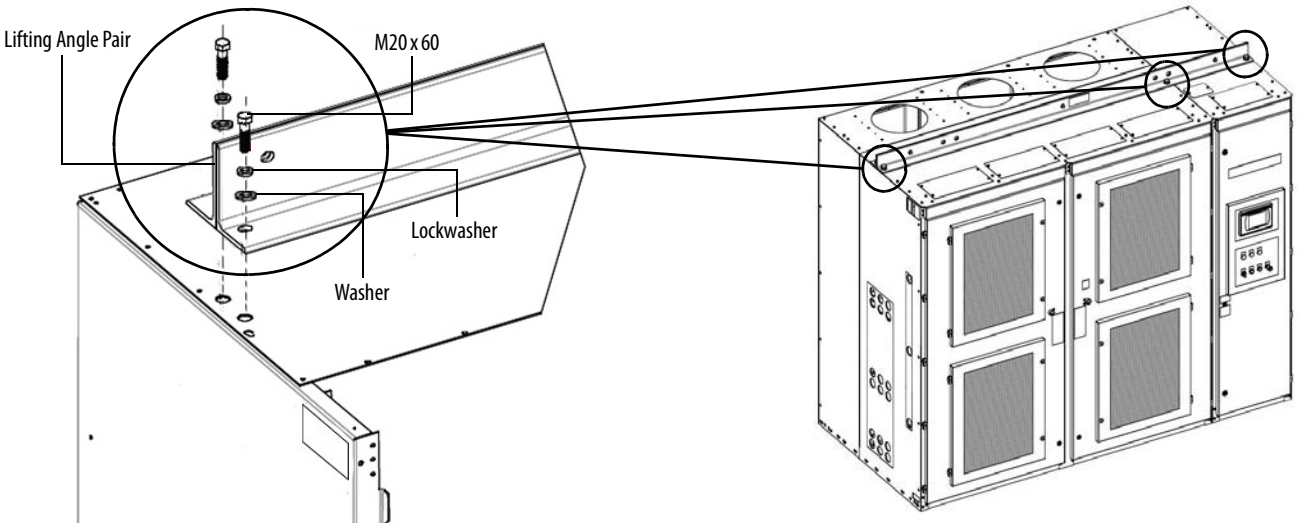
ATTENTION: Failure to install the pair of lifting angles prior to moving the drive may result in personal injury and/or equipment damage.

The lifting angles hold the Power Module/LV Control cabinets together to prevent separation and damage while riggers move the drive to the final installation area.

The lifting angles are shipped with the Power Module/LV Control Cabinet and must be secured before lifting the cabinet.

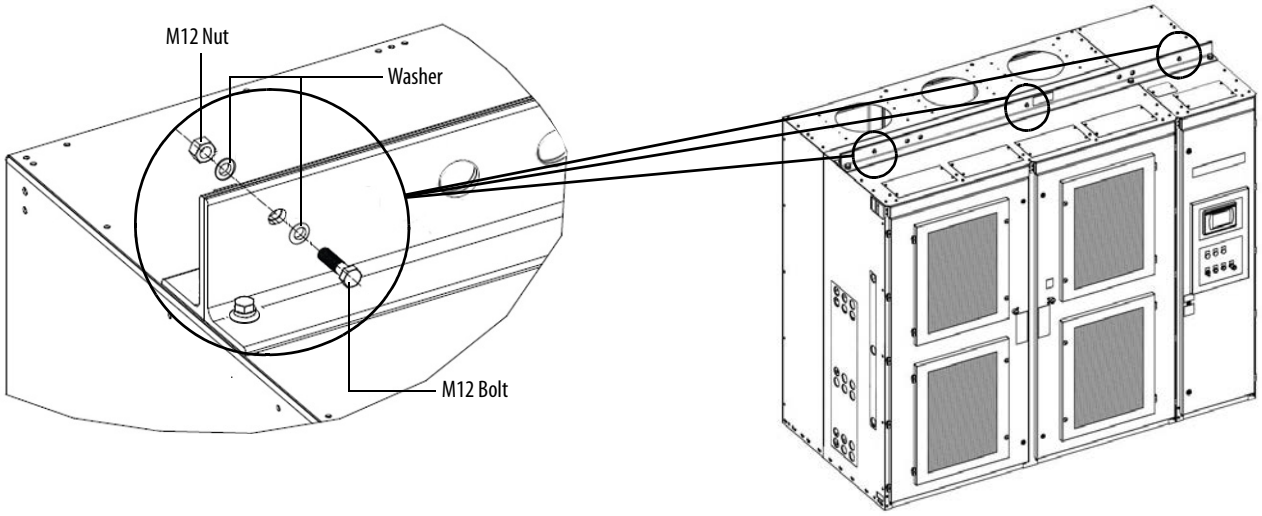
1. Remove the lifting angles from the skid.
2. Remove the attachment hardware that is pre-installed in the mounting holes in the cabinet top plate before shipment.
3. Align and secure the lifting angles in six places as shown in Figure 22 using the hardware removed in step 2.

Figure 22 - Install Fasteners from the Lifting Angles to the Drive in six places



4. Install the supplied hardware (M12 bolt and nut, two flat washers) to join the lifting angles together in three places (Figure 23).

Figure 23 - Bolt vertical slots on the Lifting Angles in three places



Attach the Overhead Lifting Cables

1. Attach rigging assembly firmly to the lifting angles on the top of the Power Module/LV Control Cabinet (Figure 24).

ATTENTION: The load carrying capacity of the lifting device and rigging must be sufficient to safely raise the cabinet. Check the shipping weights by referring to the container's commercial invoice.

ATTENTION: Do not pass cables through the support holes in the lifting angles. Use slings with safety hooks or shackles.

2. Adjust the rigging lengths to compensate for any unequal weight distribution of load.

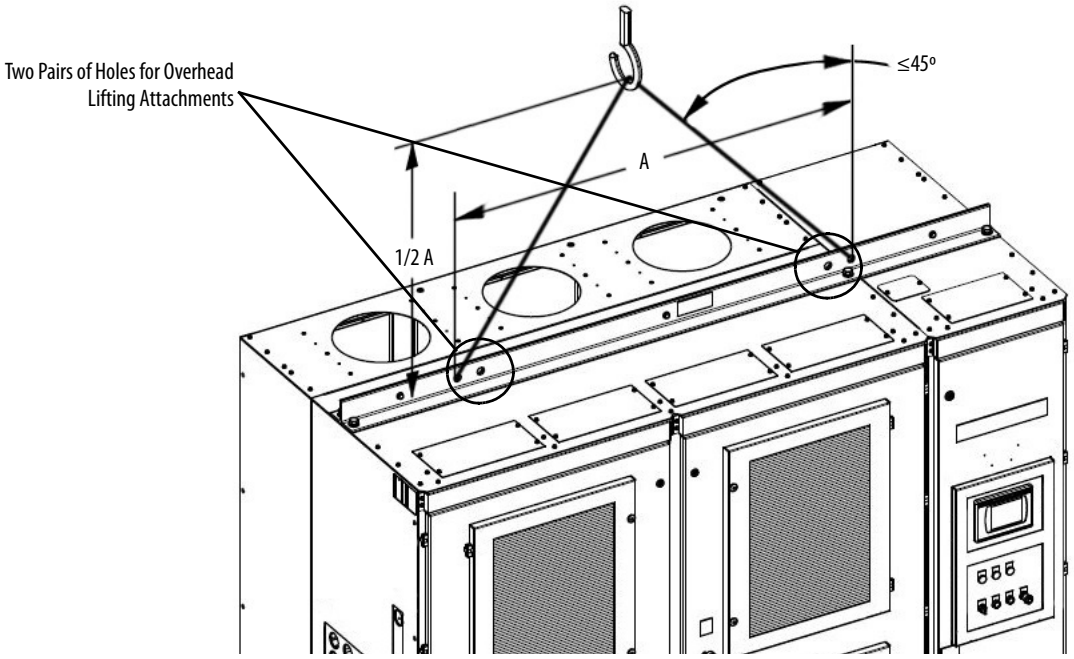
TIP There are pairs of holes to attach lifting cables on either end of the lifting angle. Generally use the outside holes on either end for the greatest stability. The inner holes could be used to adjust for the cabinet's center of gravity.

The cabinet must remain in an upright position.

To reduce the tension on the rigging and the compressive load on the lifting device, do not allow the angle between the lifting cables and vertical to exceed 45° (Figure 24).

ATTENTION: Do not tilt the drive.

Figure 24 - Overhead Lifting (Power Module/LV Control Cabinet)



3. Remove the steel angle brackets bolting the cabinet to the skid.
4. Lift the cabinet using overhead lifting angles and remove the wooden shipping skid from under the equipment.

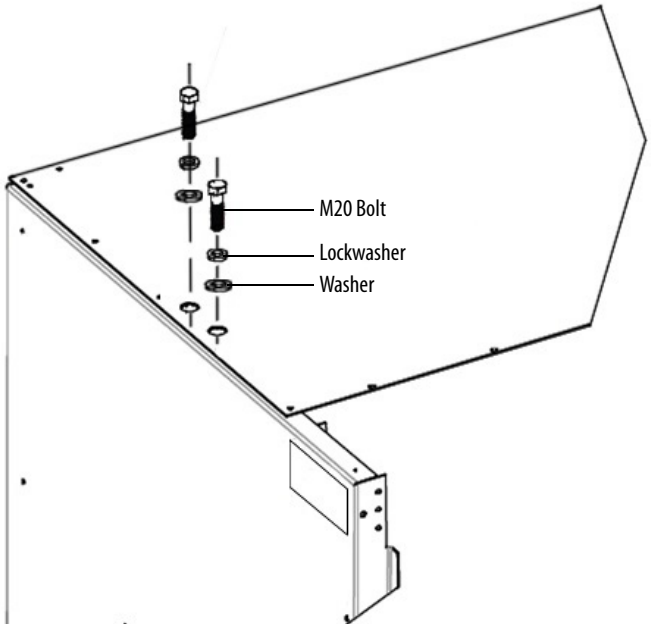
ATTENTION: Only lift the cabinet high enough to remove the shipping skid at this point. Do not place any parts of the body underneath the cabinet. Remove the shipping skid from the work area before continuing.

Remove Overhead Lifting Cables and Lifting Angles

When the cabinet is in the desired position, remove the lifting angles.

1. Remove rigging from the lifting angles, and remove the bolts holding the lifting angles together; retain or recycle hardware.
2. Remove and retain the hardware from the base of the lifting angles and retain or recycle the lifting angles.
3. Reinstall the hardware (M20 x 60) removed in step 2 (to seal the holes) on the top of the drive (Figure 25).

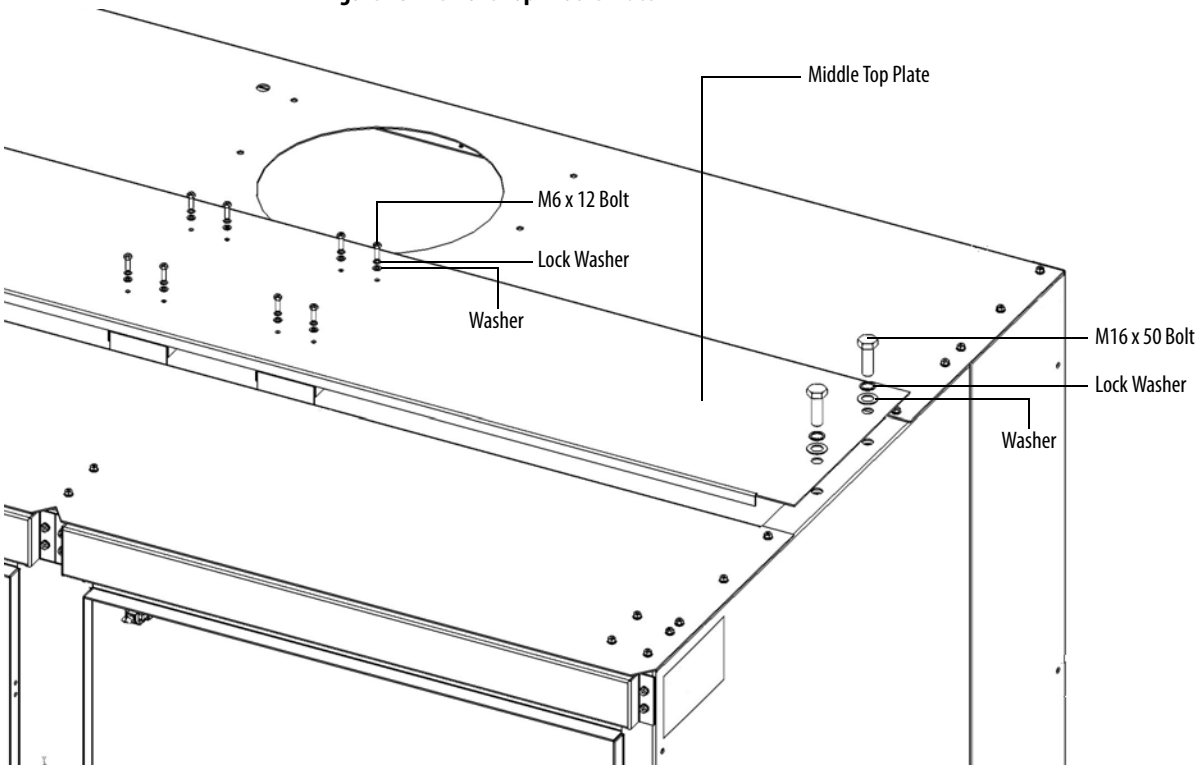
Figure 25 - Insert bolts



Lift the Isolation Transformer Cabinet

1. Unfasten and remove the middle top plate on top of the cabinet, and retain middle top plate and hardware.

Figure 26 - Remove Top Middle Plate



The cabinet version with a single main cooling fan will have two support brackets. The cabinet version with two fans will have three support brackets.

Most configurations have one or two top-mounted main cooling fans in the isolation transformer cabinet. However, high power configurations can have more.

Figure 27 - Isolation Transformer with one Fan Assembly (Overhead view)

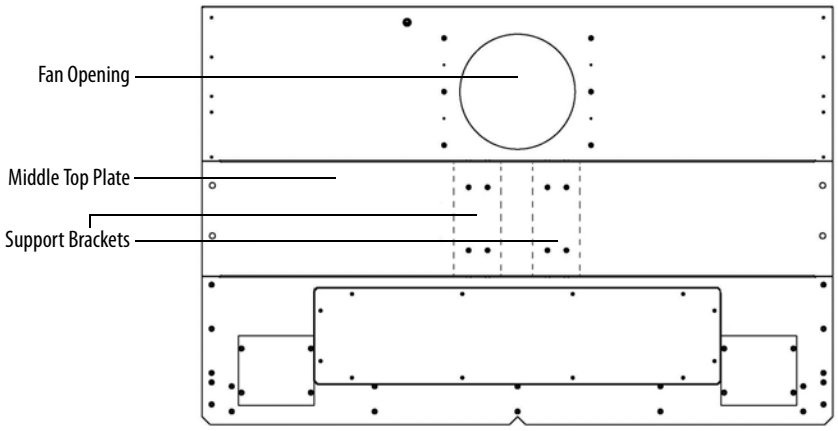
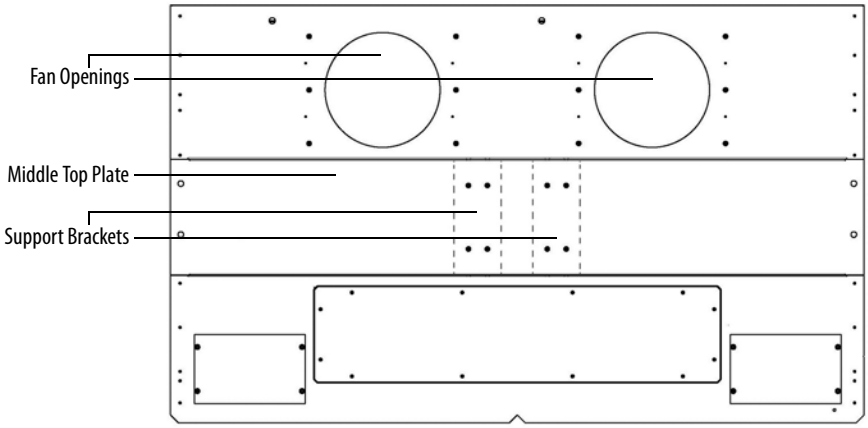
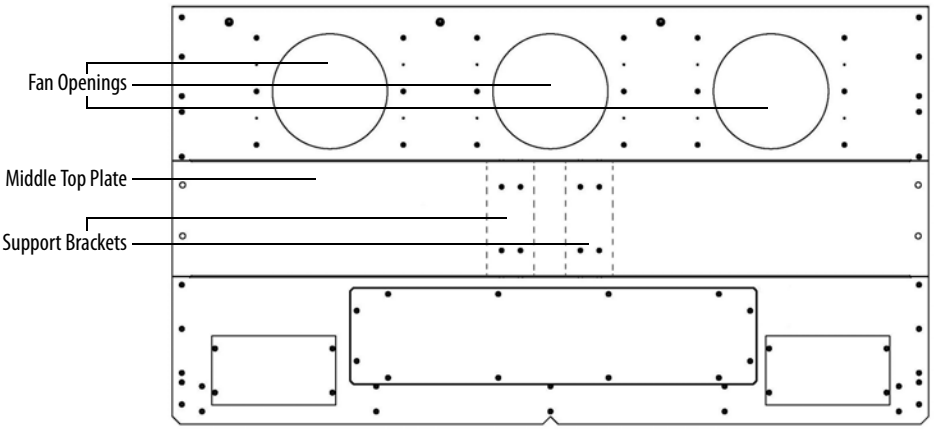


Figure 28 - Isolation Transformer with two Fan Assemblies (Overhead view)



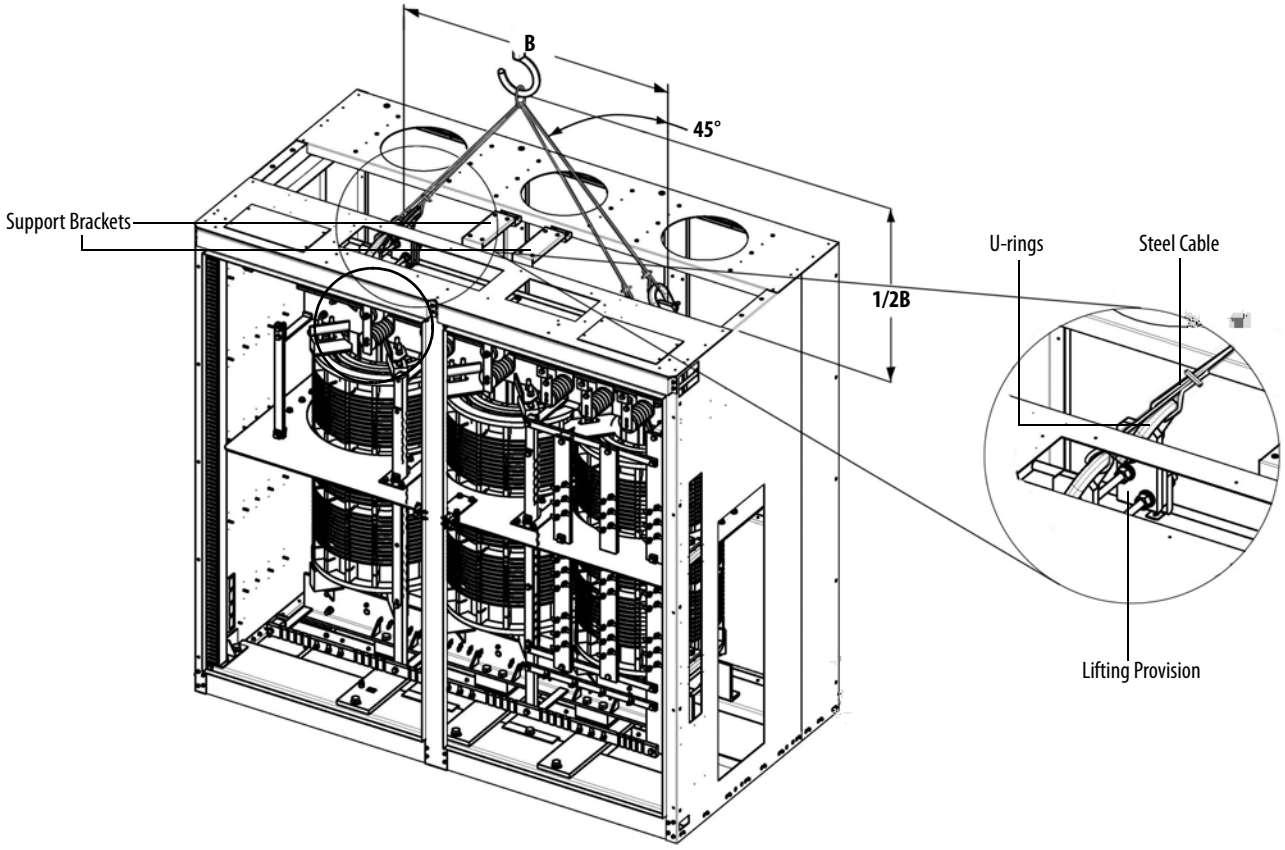
2. Attach the steel cable to the U-ring attachments (Figure 30), ensuring the cables pass freely though the center section of the cabinet and that they do not contact the middle top plate support brackets.

Figure 29 - Isolation Transformer with three Fan Assemblies (Overhead view)



3. Attach the U-ring attachments to the lifting provisions on the isolation transformer.

Figure 30 - Overhead Lifting (Isolation Transformer Cabinet)



ATTENTION: The cabinet is attached to the base of the isolation transformer. The cabinet is designed to be lifted only by the isolation transformer lifting provisions. Do not attach cables to the Isolation Transformer cabinet.

ATTENTION: Keep the weight of the isolation transformer centered when lifting. It is recommended to use the four lifting provisions at all corners of the isolation transformer. Alternatively, the two lifting provisions diagonally opposed could be used.

Drive Mechanical Installation (For IEC)

Introduction

The installation process is divided into three principal activities. The mechanical installation process described in this chapter, the electrical installation process described in Drive Electrical Installation (For IEC) on page 67, and the electrical interconnection process described in Drive Electrical Interconnection (For IEC) on page 95.

Mechanical Installation Summary

The cabinets must be arranged as shown in the Dimensional Drawing.

Follow all applicable guidelines for siting the components before continuing with these installation instructions.

There may be some variation in the process depending on the type and number of drive components in your particular installation.

Connect Shipping Splits

ATTENTION: Install the drive on a level surface (+/- 1 mm per meter [+/- 0.036 in. per 36 in.] of drive length in all directions). If necessary, use metal shims to level the cabinets before joining them; attempting to level after joining may twist or misalign the cabinets.

The PowerFlex 6000 drive is shipped in two sections, the Isolation Transformer Cabinet and Power Module/LV Control Cabinet. These two cabinets must be connected after located in its final position. The cabinets are connected together in 10 places, five along the front edge of the cabinet and five along the rear edge of the cabinet. Access to the interior of the cabinet is required to make these connections. Access for the front connections requires only opening the doors. Access for the rear connections requires removing the back plates of the cabinet.

IMPORTANT Rear access to all cabinets is required for subsequent processes. Do not reinstall back plates until after the conclusion of the Drive Electrical Interconnection process.

1. Arrange the sections as directed in the Dimensional Drawings and move the sections together.

2. Align the cabinet side sheets together at the holes for the hardware (see step 3).

Figure 31 - Aligning Cabinets with Fixed-mounted Power Modules (6/6.6 kV shown)

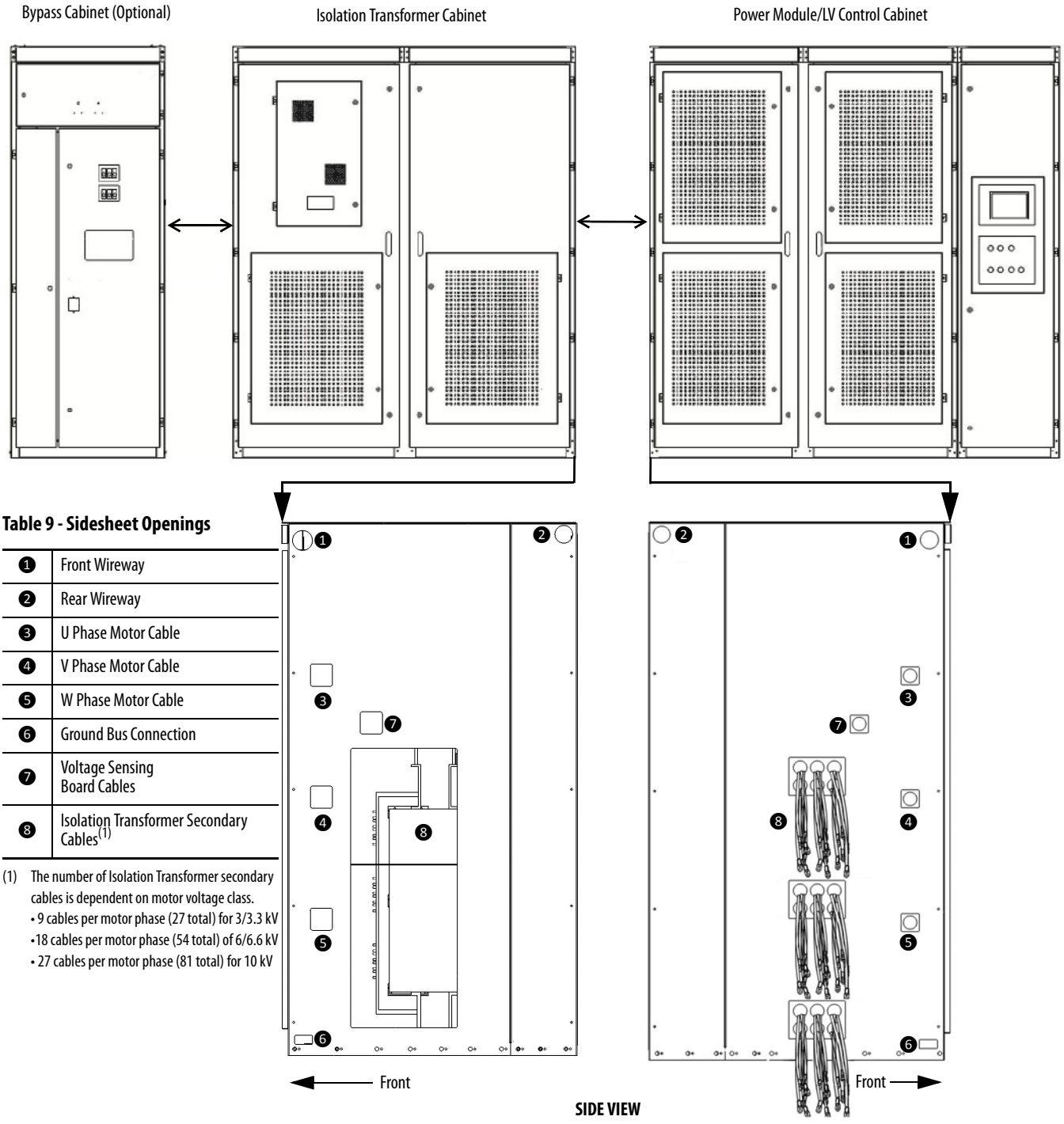


Table 9 - Sidesheet Openings

❶	Front Wireway
❷	Rear Wireway
❸	U Phase Motor Cable
❹	V Phase Motor Cable
❺	W Phase Motor Cable
❻	Ground Bus Connection
❼	Voltage Sensing Board Cables
❽	Isolation Transformer Secondary Cables(1)

(1) The number of Isolation Transformer secondary cables is dependent on motor voltage class.
- 9 cables per motor phase (27 total) for 3/3.3 kV
- 18 cables per motor phase (54 total) of 6/6.6 kV
- 27 cables per motor phase (81 total) for 10 kV

Figure 32 - Aligning Cabinets with Drawout Power Modules (6/6.6 kV shown)

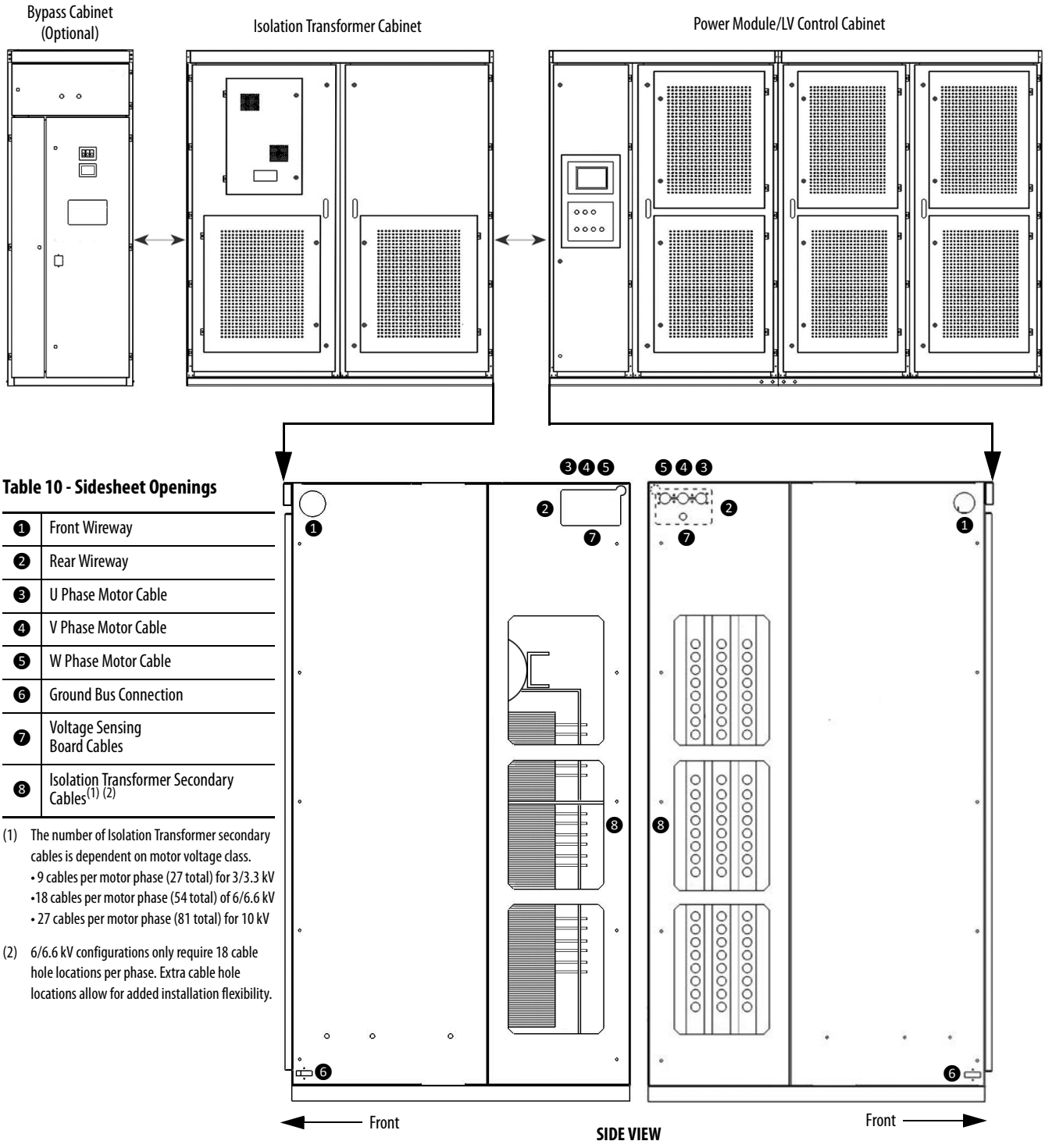


Table 10 - Sidesheet Openings

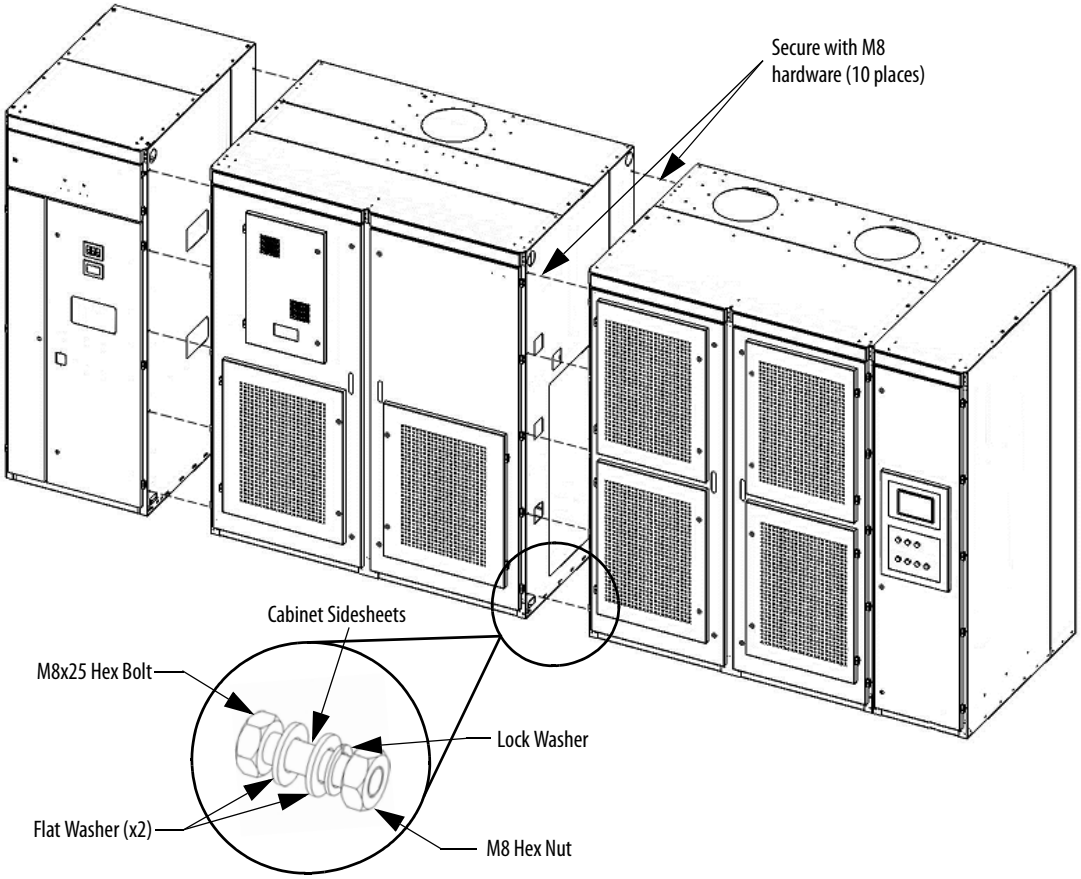
❶	Front Wireway
❷	Rear Wireway
❸	U Phase Motor Cable
❹	V Phase Motor Cable
❺	W Phase Motor Cable
❻	Ground Bus Connection
❼	Voltage Sensing Board Cables
❽	Isolation Transformer Secondary Cables(1) (2)

(1) The number of Isolation Transformer secondary cables is dependent on motor voltage class.
- 9 cables per motor phase (27 total) for 3/3.3 kV
- 18 cables per motor phase (54 total) of 6/6.6 kV
- 27 cables per motor phase (81 total) for 10 kV

(2) 6/6.6 kV configurations only require 18 cable hole locations per phase. Extra cable hole locations allow for added installation flexibility.

3. Secure the cabinets together using M8 hardware. See Torque Requirements on page 119 for proper torque requirements.

   Open the doors to access front edge joining holes (5 places).

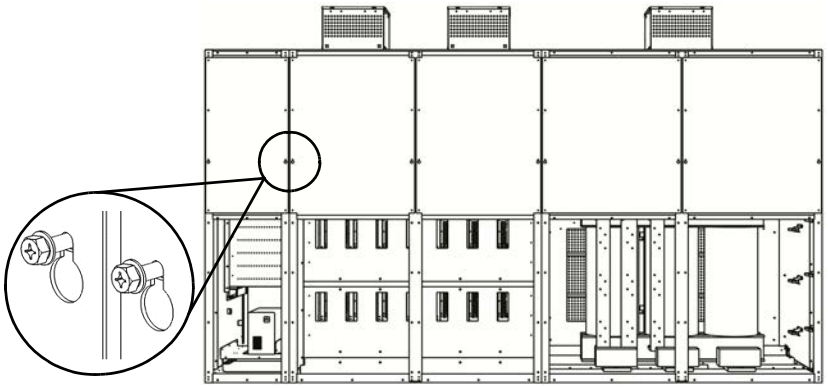


4. Remove all back plates to access rear edge joining holes (5 places).

TIP Each back plate will have two keyhole screw holes on either side. Remove all of the other screws first. Loosen the two screws in the keyhole screw holes last and lift the back plate to remove. Do not remove these screws.

Do not replace the back plates until the Drive Electrical Interconnection Process is complete (See Drive Electrical Interconnection (For IEC) on page 95).

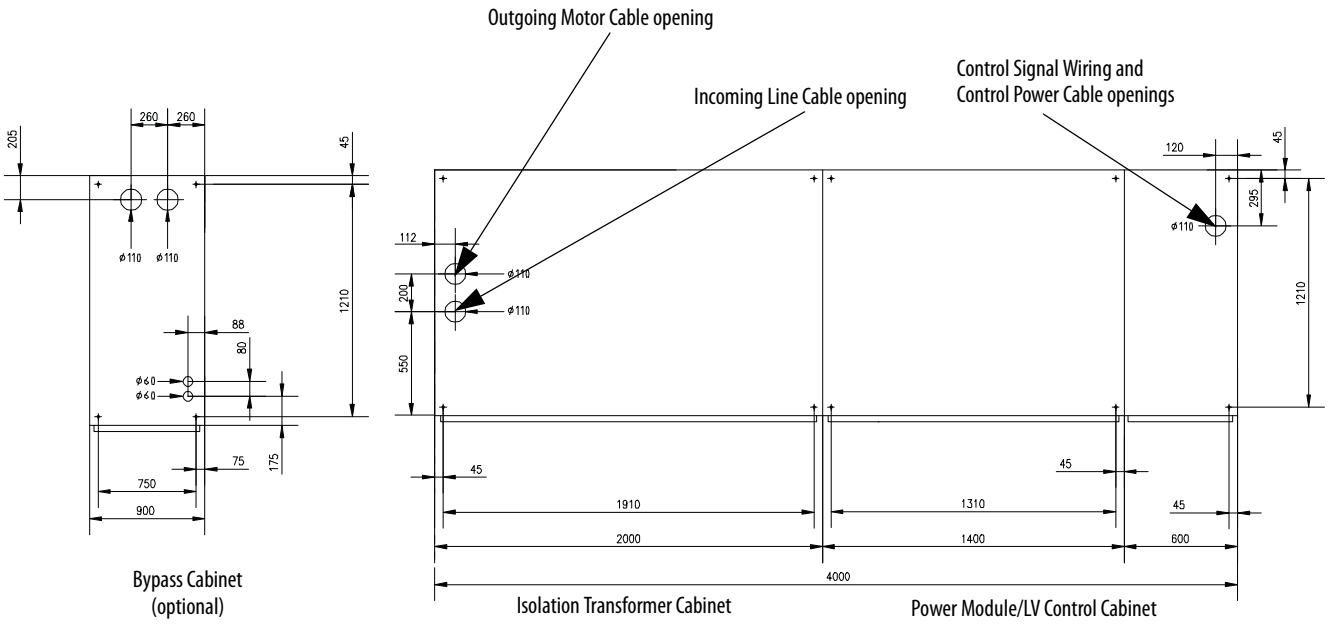
To replace the back plates, the two remaining screws orient and hold the back plate in place while fastening the other screws holding the back plates to the frame of the cabinet. Tighten these screws last to complete the process.



Affix Cabinets to Floor

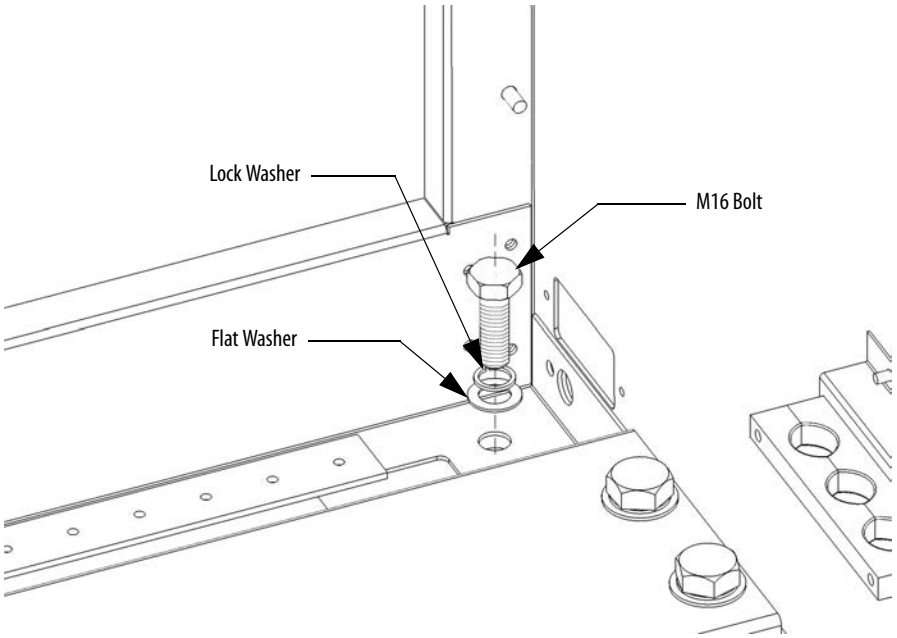
Typical floor drawings show minimum clearance distance, conduit openings, and mounting holes for anchor bolts(1), as shown in Figure 33. Refer to project-specific Dimensional Drawings for actual locations.

Figure 33 - Typical Floor Drawing (Fixed-mounted Power Module Configuration)



Secure the cabinet to the channel steel base using M16 bolt, lock washer, two flat washers and a nut.

Figure 34 - Bolt Cabinet to Steel Base

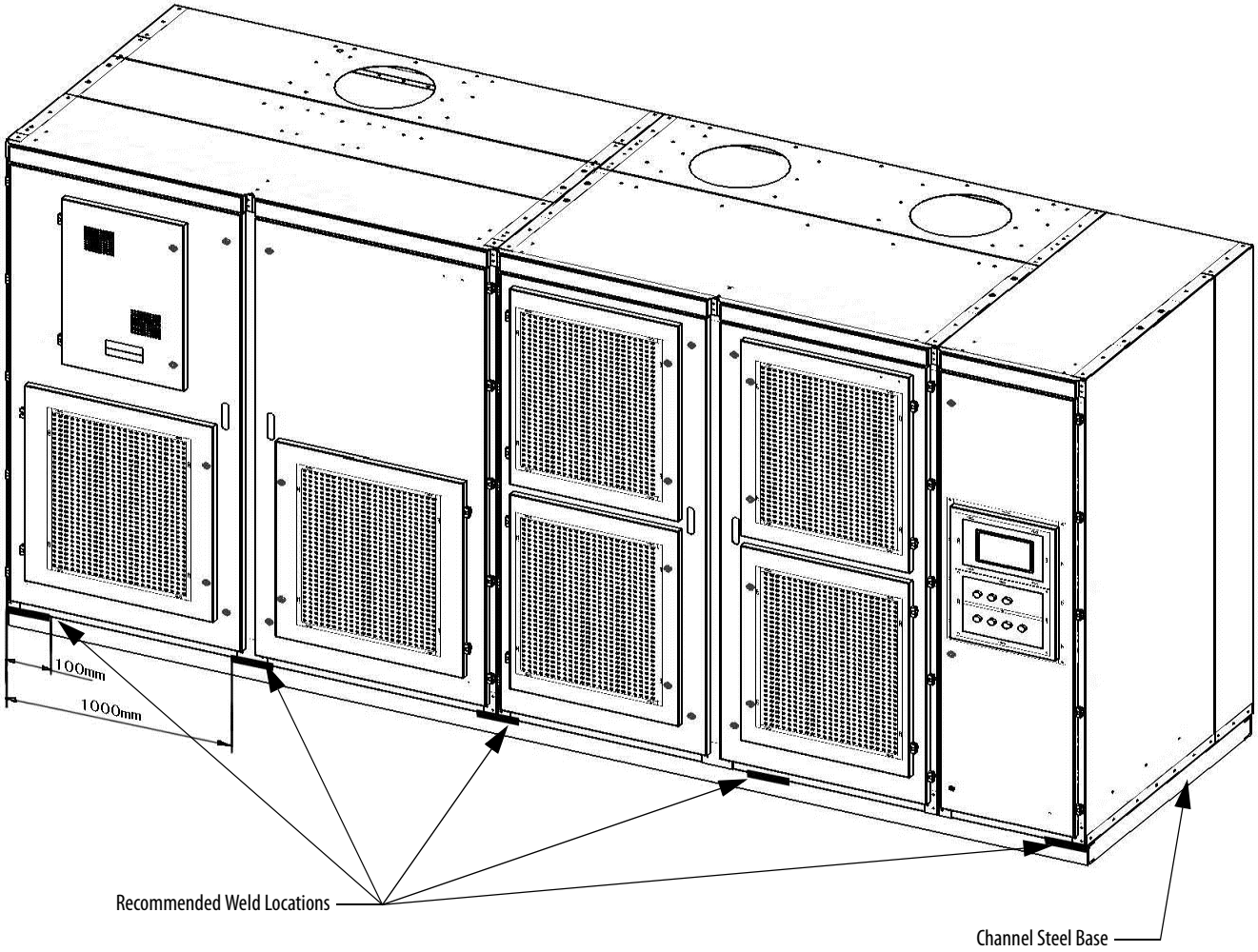


(1) Mounting holes are represented as + in Figure 33.

Optional: The cabinet can also be welded to the steel base once it is securely bolted, if desired.

Each weld location should be 100 mm (3.9 in.) for every 1000 mm (39.4 in.). See Mounting Requirements on page 18 for further information on the steel base and desired trench and mounting specifications.

Figure 35 - Welding locations



ATTENTION: Failure to correctly anchor the cabinet may result in damage to the equipment or injury to personnel.

Install Main Cooling Fans

Main cooling fans are shipped in separate crates (Table 1). The fans are shipped assembled in the fan housing, but must be installed after siting the drive.

Most drive configurations will have two to five fans. Higher power configurations will have a higher number of fans. See PowerFlex 6000 Dimensions and Weights (For IEC) on page 123 for fan quantities and dimensions.

IMPORTANT See Mounting Clearance Distance on page 18 to verify that the fans have the appropriate clearance distance on top of the cabinet.

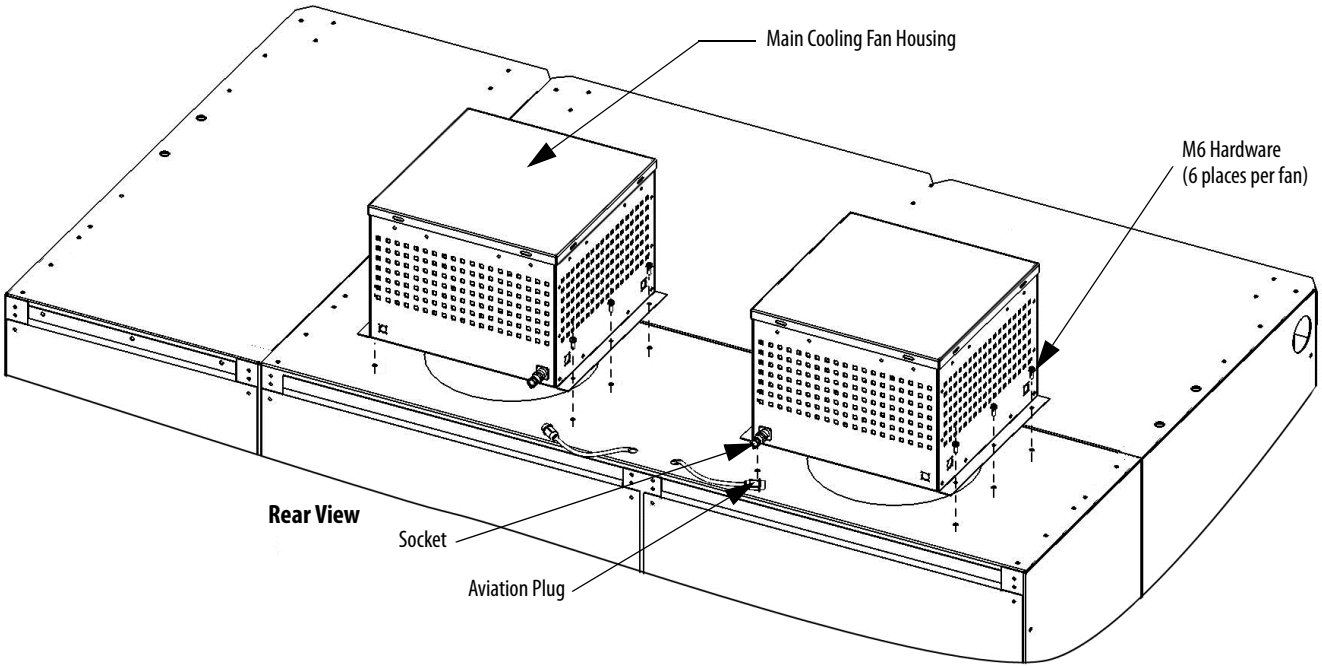
Table 11 - Fan Housing Specifications

Model	Dimensions (HxWxD), approx.	Weight, approx.
RH40M	330 x 440 x 500 mm (13.0 x 17.3 x 19.7 in.)	20 kg (44.1 lb)
RH45M	370 x 490 x 550 mm (14.6 x 19.3 x 21.7 in.)	25 kg (55.1 lb)

1. Place the fan housing on the top plate of the drive, making sure the socket is on the same side as the aviation plug.
2. Secure the fan housing using M6 hardware (6 places).

   See Torque Requirements on page 119.
3. Connect the aviation plug located on top of the cabinet with the socket on the fan housing.

Figure 36 - Main Cooling Fan Housing



Install Drawout Power Modules (if applicable)

Power Modules are available in a wide variety of amperage ratings relating to the required motor current. Power Modules rated up to and including 200 A are fixed-mounted in the drive and ship already installed.

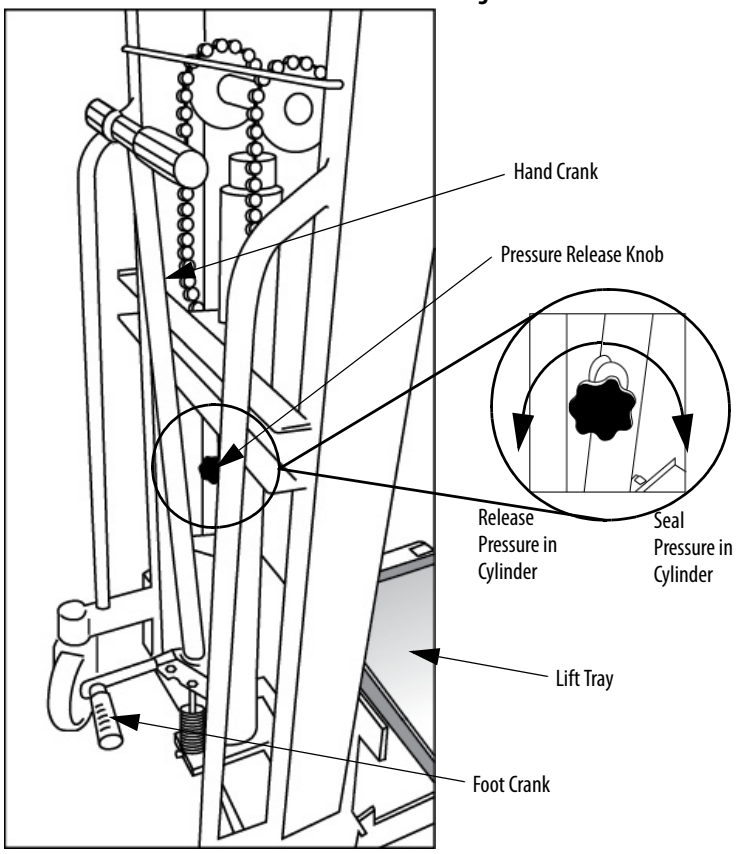
Drawout power modules are supplied for a drive current rating of >200 A. The power modules are shipped separately and must be installed in the cabinet. A Power Module lift cart is included and shipped together with the other components.

Power Module Lift Cart

ATTENTION: Only authorized personnel should operate the lift cart. Keep hands and feet away from the lifting mechanism. Do not stand under the lift tray when in use. Store the lift cart with the tray fully lowered.

Lift Carts are supplied and shipped separately with drawout power module configurations. The unit's hydraulic cylinder can be operated by either a hand or foot crank. The lifting capacity is 1000 kg (2206 lb).

Figure 37 - Lift



1. Visually inspect the lift cart to ensure it is fully operational.
2. Turn the Pressure Release Knob clockwise until tight.
3. Raise the lift tray using the Hand Crank or the Foot Crank.

   TIP The Foot Crank raises the lift tray faster than the Hand Crank. Use this to raise the Power Module to just below the tray assembly in the drive. Use the Hand Crank for final precise positioning.

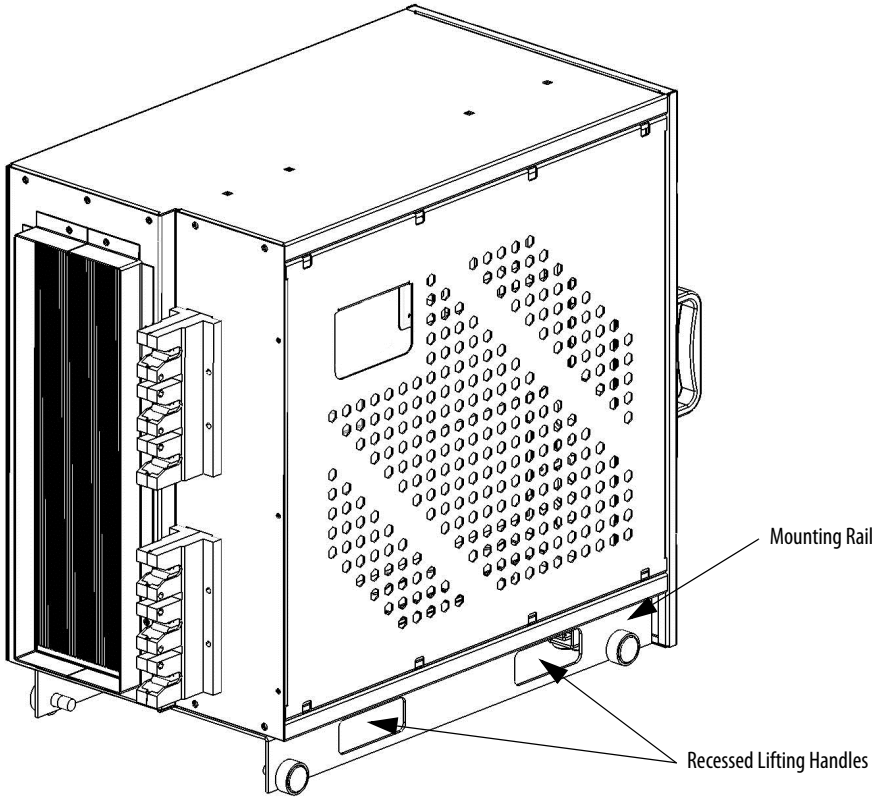
4. Lower the lift tray by turning the Pressure Release Knob counter-clockwise.

Table 12 - Power Module Specifications

Type	Output Rating (Amps)	Dimensions (HxWxD), approx.	Weight, approx.
Fixed-mounted	≤150 A	420 x 180 x 615 mm (16.5 x 7.1 x 24.2 in.)	20 kg (44.1 lb)
	151...200 A	420 x 260 x 615 mm (16.5 x 10.2 x 24.2 in.)	25 kg (55.1 lb)
Drawout	201...380 A	575 x 342 x 691 mm (22.6 x 13.5 x 27.2 in.)	40 kg (88.2 lb)
	381...420 A	575 x 342 x 910 mm (22.6 x 13.5 x 35.8 in.)	50 kg (110.2 lb)

ATTENTION: Two people are required to handle the Power Modules. Always handle the drawout Power Modules using the two recessed lifting handles on both mounting rails (Figure 38).

Figure 38 - Drawout Power Module Lifting Handles



ATTENTION: Do not use the front mounted positioning handles for lifting the Power Modules. They are designed to position or withdraw the Power Module when on the tray assembly.

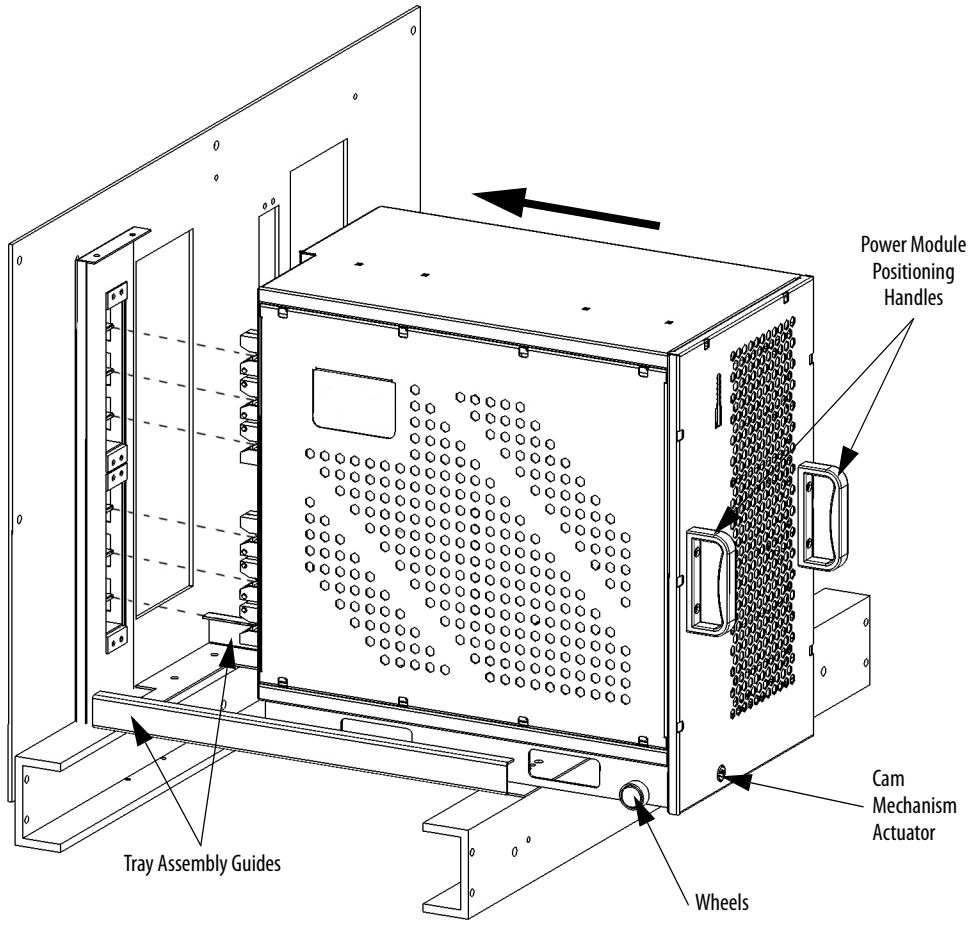
Install Power Modules

1. Place the Power Module module on the lift cart.

   Ensure the Power Module is properly oriented; the finger assemblies must face towards the drive.

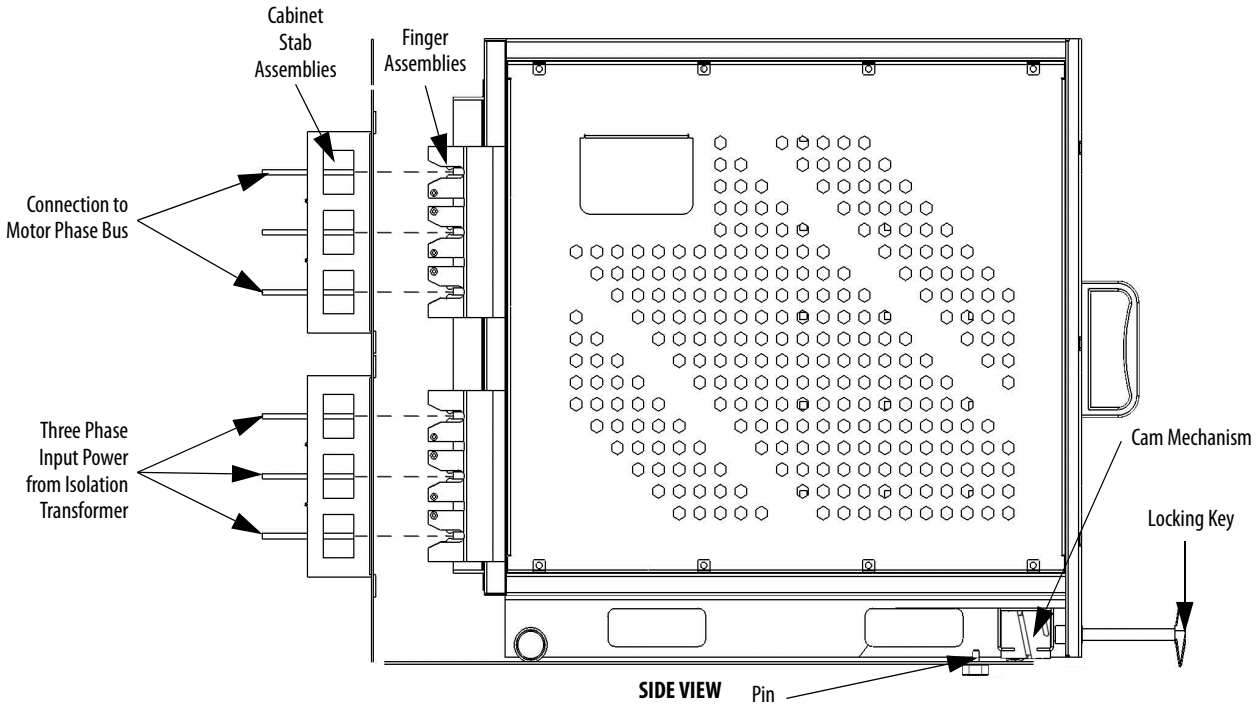
2. Position the lift cart in front of the cabinet and raise the Power Module to the proper height.

3. Align the wheels on the Power Module with the tray assembly guides on each side of the Power Module tray assembly.



4. Push the Power Module slowly backwards into the cabinet until the cam mechanism contacts the pin mounted on the tray assembly.

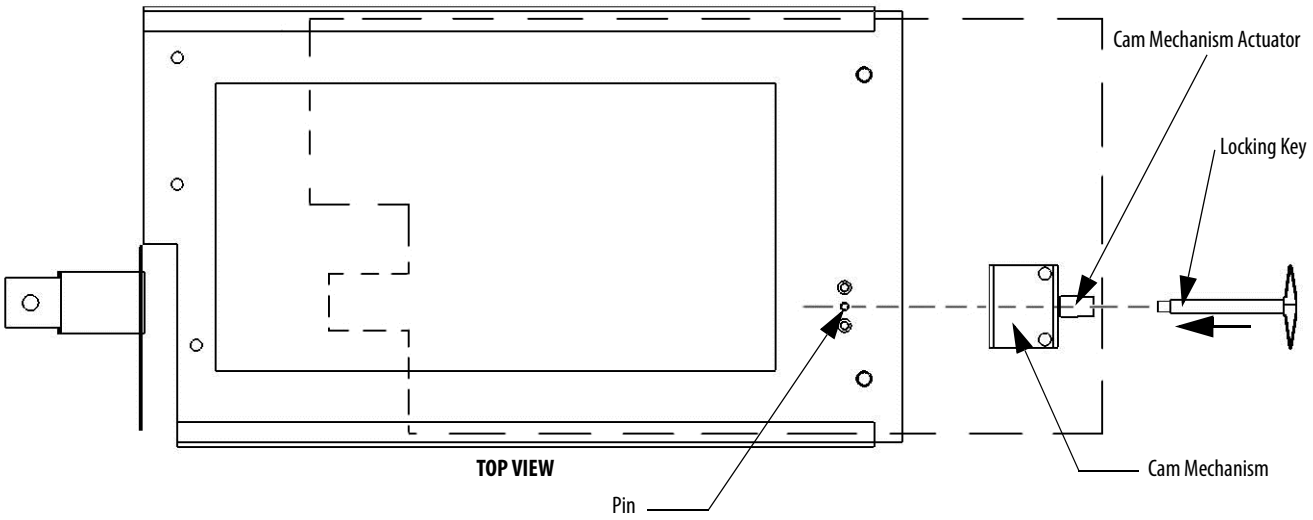
5. Insert the locking key into the cam mechanism actuator and rotate clockwise while gently pushing on the face of the Power Module.



The cam mechanism will catch the pin on the tray assembly.

6. Continue rotating the locking key until the Power Module is fully seated.

This ensures the finger assemblies at the back of the Power Module are fully connected to the stab assemblies at the back of the Power Module compartment.



ATTENTION: The Power Module finger assemblies must be fully seated on the cabinet stab assemblies.

External Ducting

The PowerFlex 6000 design can accommodate ducting exhaust air outside of the control room.

ATTENTION: The Isolation Transformer Cabinet and the Power Module/LV Control Cabinet must be ducted separately.

The following requirements are mandatory design requirements for systems that will externally duct the exhaust air and draw cleansed outside air:

- External ducting including an external filtering system must not add more than 50 Pa (0.2 in. of water) pressure drop to the PowerFlex 6000 drive air flow system. Ensure a minimum top clearance of 1000 mm (39.4 in.) above the drive top plate.
- The control room must provide slightly more make-up air, creating a pressurized room. This slight pressurization prevents unfiltered air drawing into the room.
- The drive is intended to operate in conditions with no special precautions to minimize the presence of sand or dust, but not in close proximity to sand or dust sources. IEC 721-1 defines this as being less than 0.2 mg/m^3 of dust.
- If outside air does not meet this condition, filter the air to EU EN779 Class F6 or ASHRAE Standard 52.2 MERV 11. These ratings address a high percentage of the 1.0...3.0 µm particle size. Clean or change filters regularly to ensure proper flow.
- The make-up air must be between 0...40 °C (32...104°F).
- Relative humidity must be less than 90% non-condensing.
- If the ducting length is greater than 3 m, an axial fan must be installed at the air outlet. The exhaust flow of the axial fan must be greater than the total flow amount of all the centrifugal fans in this air duct.
- The ducting must not be shared by the two cabinets.
- The distance from each side of the hood to the corresponding side of the fan must not be less than 60 mm (2.4 in.).
- Do not cover any medium voltage or control power wires which enter or exit from the top of the cabinet.
- The air duct outlet must slope downward to prevent water damage.
- Screens must be installed in the air duct outlet.

- An air inlet must be added to the drive room. The cross-sectional area of this inlet must meet the ventilation requirements of all drives. Screens must be installed in the air inlet.
- The air inlet must be at least 1000 mm (39.4 in.) above the floor.
- The air inlet and outlet must not be at the same side of the drive room.

Air Conditioning Sizing

If the drive is located in an enclosed space, install air conditioners for each drive. A general formula to calculate air conditioner power required:

$$\frac{DriveRating(kW) \times (1 - DriveEfficiency)}{3.5} = \text{Air Conditioning Size (tons)}$$

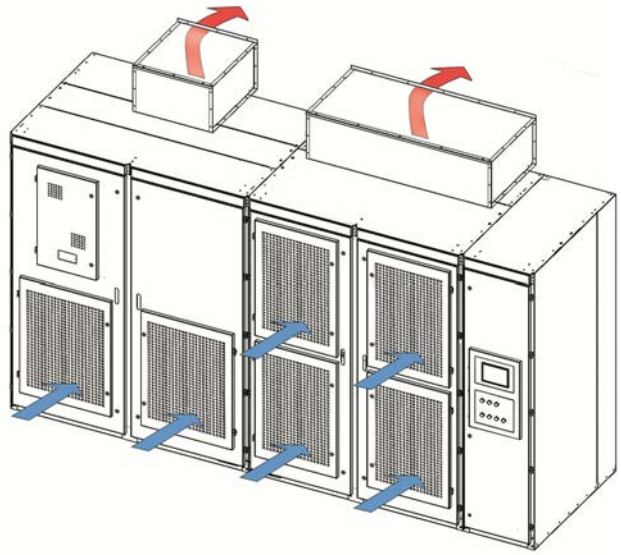
EXAMPLE For a 1000 kW drive with 96.5% efficiency:

$$\frac{1000 \times (1 - 0.96\dot{5})}{3.5} = 10 \text{ tons of AC required}$$

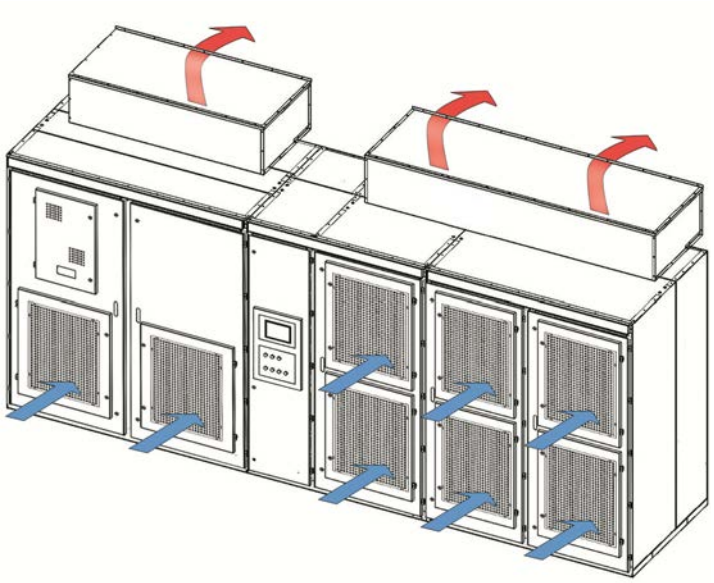
This is for a general estimate. Refer to the actual heat loss data to calculate air conditioning sizing. Contact the local Rockwell Automation office for actual data.

Figure 39 - Airflow for Fixed-mounted and Drawout Cabinet Configurations(1)

Fixed-mounted Power Module Configuration



Drawout Power Module Configuration



(1) Top ducting shown by contractor.

Notes:

Drive Mechanical Installation (For UL)

Introduction

The installation process is divided into three principal activities. The mechanical installation process described in this chapter, the electrical installation process described in Drive Electrical Installation (For UL) on page 81, and the electrical interconnection process described in Drive Electrical Interconnection (For UL) on page 107.

Mechanical Installation Summary

The cabinets must be arranged as shown in the Dimensional Drawing.

Follow all applicable guidelines for siting the components before continuing with these installation instructions.

There may be some variation in the process depending on the type and number of drive components in your particular installation.

Connect Shipping Splits

ATTENTION: Install the drive on a level surface (+/- 1 mm per meter [+/- 0.036 in. per 36 in.] of drive length in all directions). If necessary, use metal shims to level the cabinets before joining them; attempting to level after joining may twist or misalign the cabinets.

The PowerFlex 6000 drive is shipped in two sections, the Isolation Transformer Cabinet and Power Module/LV Control Cabinet. These two cabinets must be connected after located in its final position. The cabinets are connected together in 10 places, five along the front edge of the cabinet and five along the rear edge of the cabinet. Access to the interior of the cabinet is required to make these connections. Access for the front connections requires only opening the doors. Access for the rear connections requires removing the back plates of the cabinet.

IMPORTANT Rear access to all cabinets is required for subsequent processes. Do not reinstall back plates until after the conclusion of the Drive Electrical Interconnection process.

1. Arrange the sections as directed in the Dimensional Drawings and move the sections together.

2. Align the cabinet side sheets together at the holes for the hardware (see step 3).

Figure 40 - Aligning Cabinets with Fixed-mounted Power Modules (6.0/6.3/6.6 kV shown)

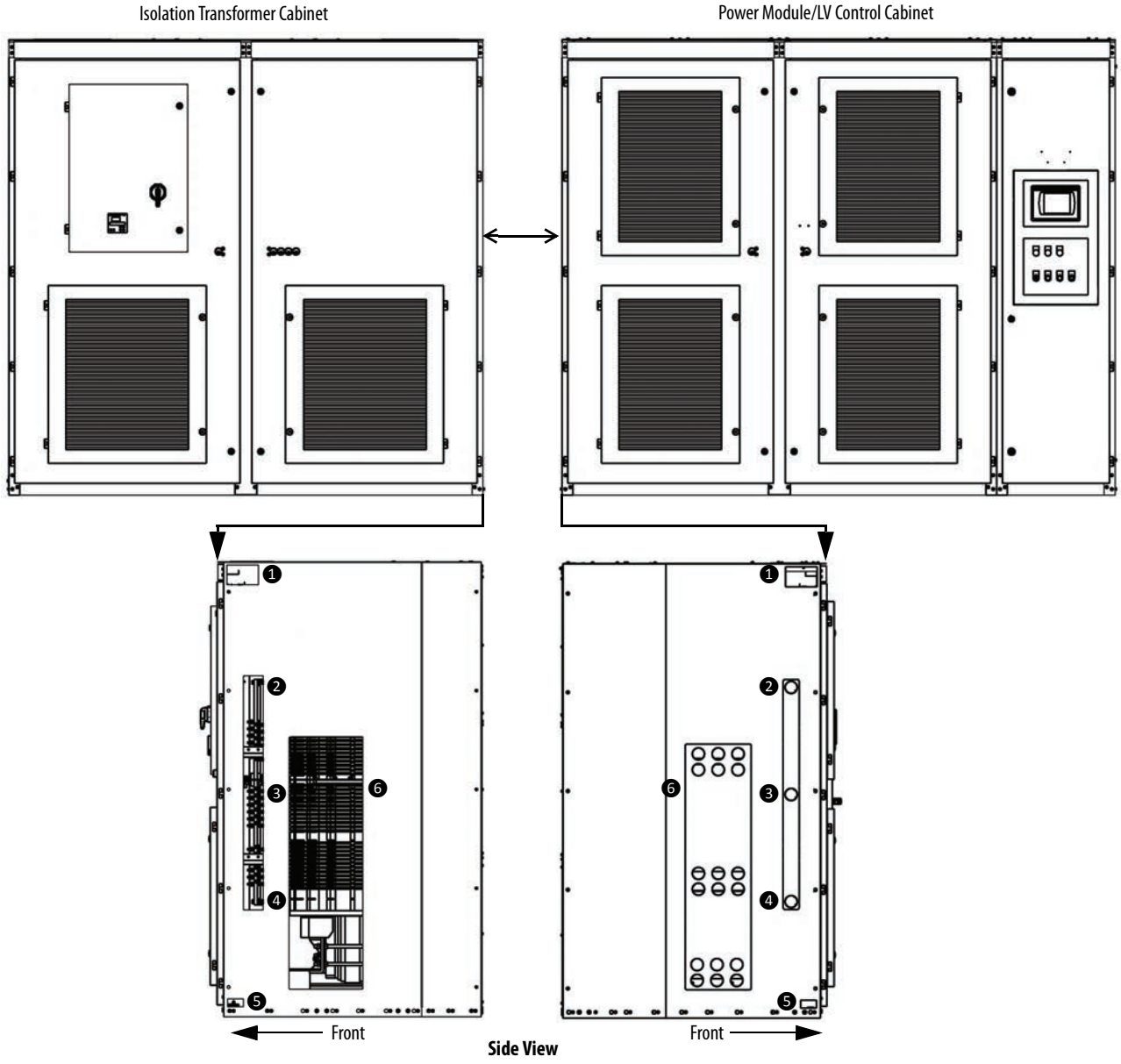


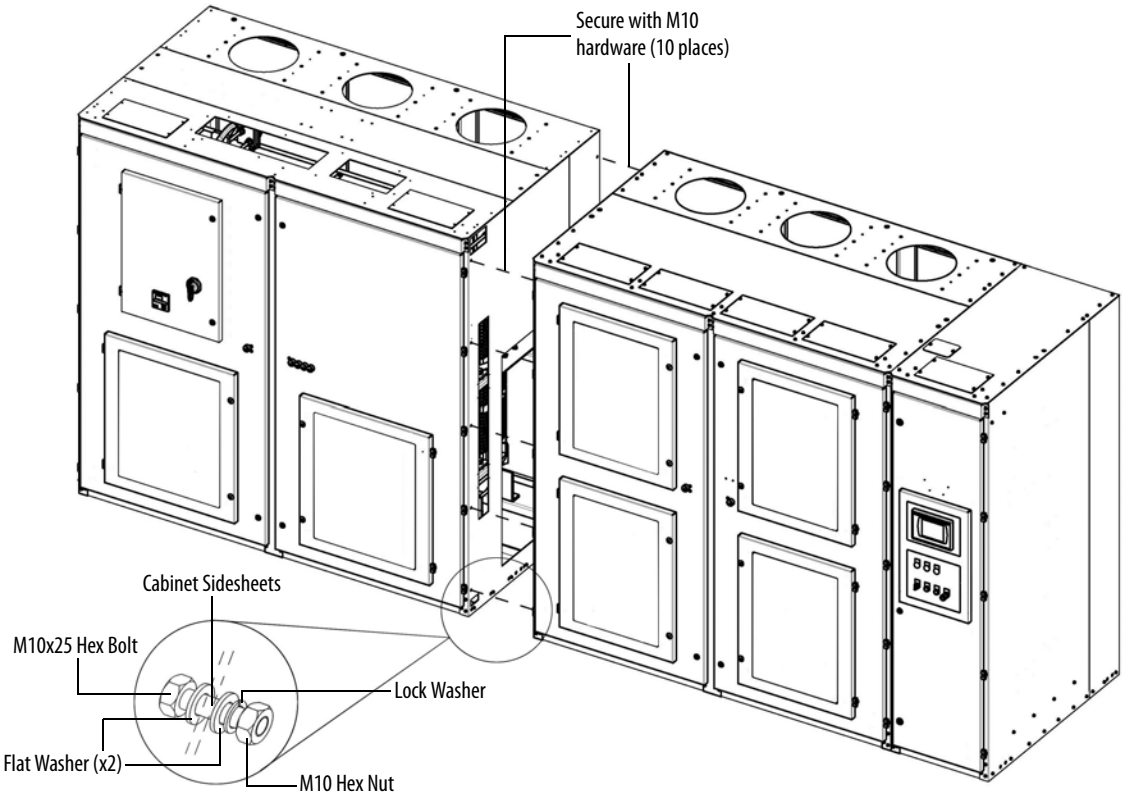
Table 13 - Sidesheet Openings

❶	Front Wireway	❹	W Phase Motor Cable
❷	U Phase Motor Cable	❺	Ground Bus Connection
❸	V Phase Motor Cable	❻	Isolation Transformer Secondary Cables(1)

(1) The number of Isolation Transformer secondary cables is dependent on motor voltage class.
- 9 cables per motor phase (27 total) for 2.3/2.4 kV
- 12 cables per motor phase (36 total) of 4.0/4.16 kV
- 18 cables per motor phase (54 total) for 6.0/6.3/6.6 kV

3. Secure the cabinets together using M8 hardware. See Torque Requirements on page 119 for proper torque requirements.

   Open the doors to access front edge joining holes (5 places).

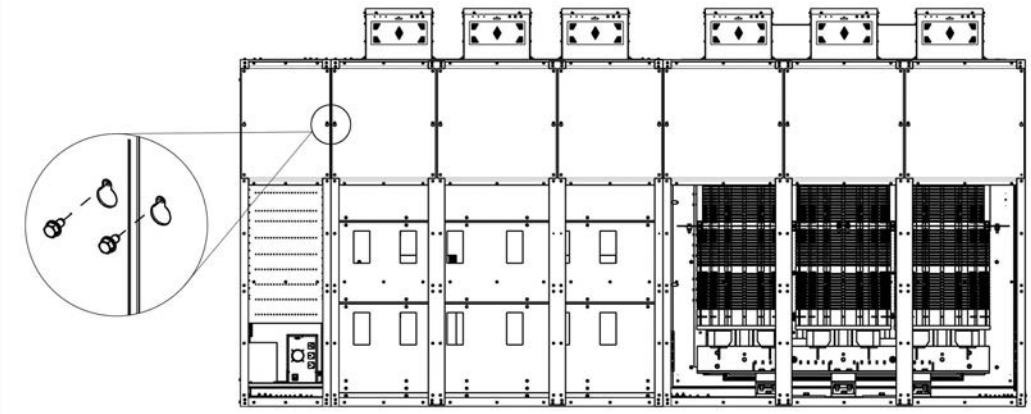


4. Remove all back plates to access rear edge joining holes (5 places).

TIP Each back plate will have two keyhole screw holes on either side. Remove all of the other screws first. Loosen the two screws in the keyhole screw holes last and lift the back plate to remove. Do not remove these screws.

Do not replace the back plates until the Drive Electrical Interconnection Process is complete (See Drive Electrical Interconnection (For UL) on page 107).

To replace the back plates, the two remaining screws orient and hold the back plate in place while fastening the other screws holding the back plates to the frame of the cabinet. Tighten these screws last to complete the process.

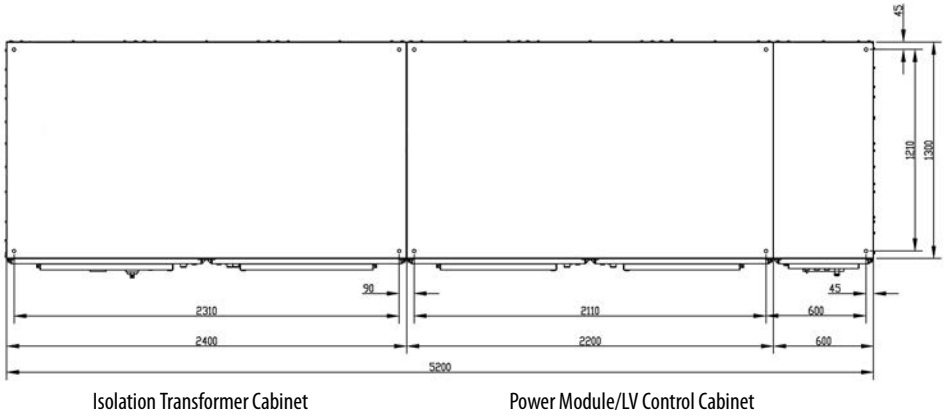


Affix Cabinets to Floor

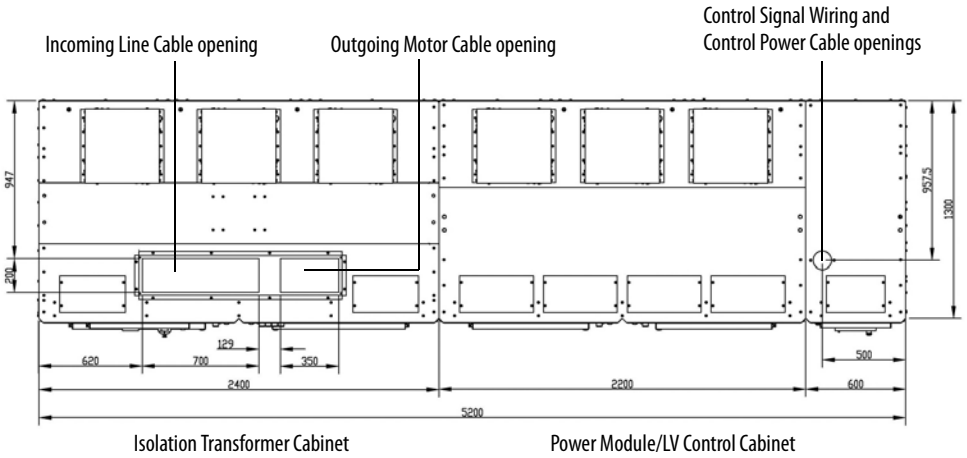
Typical floor drawings show minimum clearance distance, conduit openings, and mounting holes for anchor bolts(1), as shown in Figure 41. Refer to project-specific Dimensional Drawings for actual locations.

Figure 41 - Typical Floor Drawing (Fixed-mounted Power Module Configuration)

Bottom View

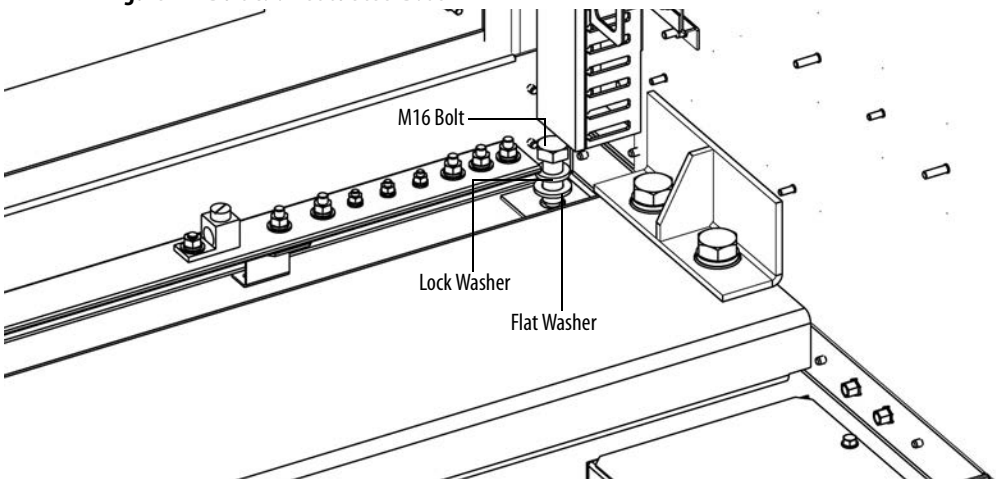


Top View



Secure the cabinet to the channel steel base using M16 bolt, lock washer, two flat washers and a nut.

Figure 42 - Bolt Cabinet to Steel Base

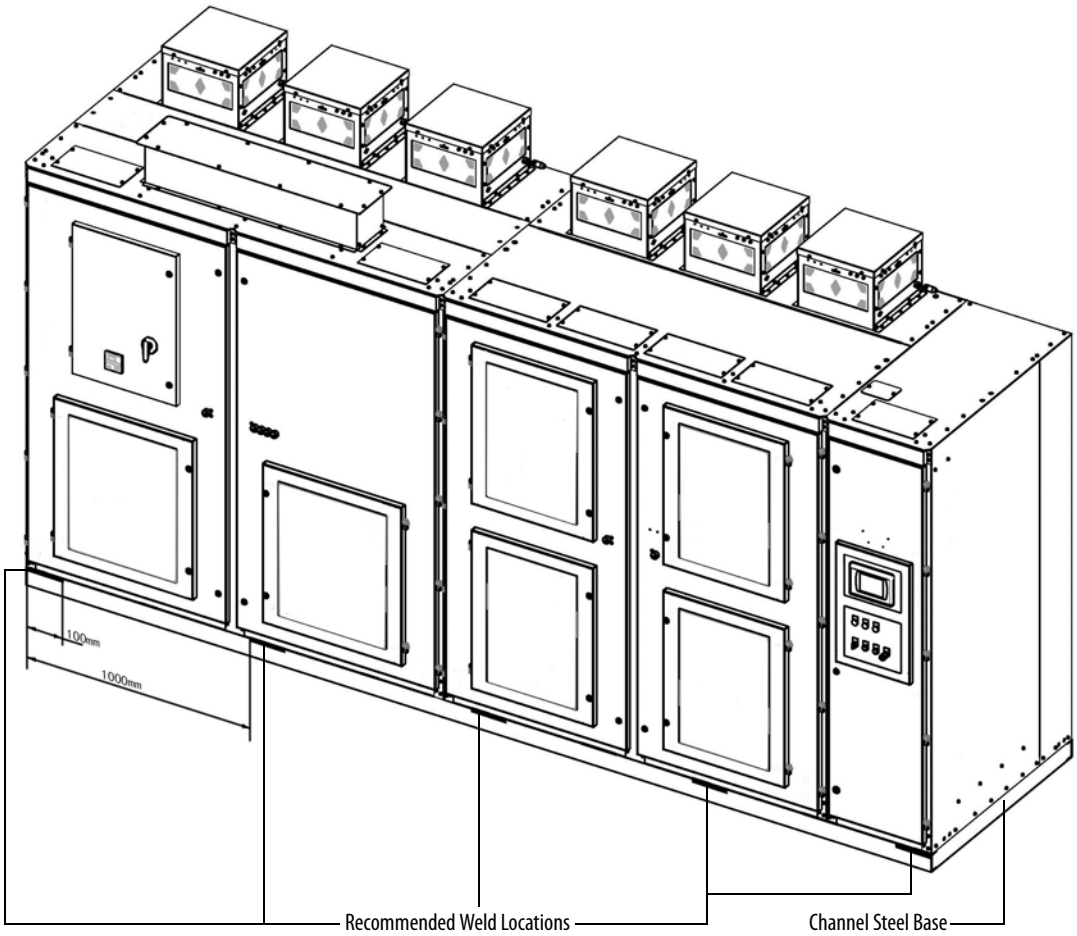


(1) Mounting holes are represented as + in Figure 41.

Optional: The cabinet can also be welded to the steel base once it is securely bolted, if desired.

Each weld location should be 100 mm (3.9 in.) for every 1000 mm (39.4 in.). See Mounting Requirements on page 34 for further information on the steel base and desired trench and mounting specifications.

Figure 43 - Welding locations



ATTENTION: Failure to correctly anchor the cabinet may result in damage to the equipment or injury to personnel.

Install Main Cooling Fans

Main cooling fans are shipped in separate crates (Table 5). The fans are shipped assembled in the fan housing, but must be installed after siting the drive.

Most drive configurations will have two to five fans. Higher power configurations will have a higher number of fans. See PowerFlex 6000 Dimensions and Weights (For UL) on page 131 for fan quantities and dimensions.

IMPORTANT See Mounting Clearance Distance on page 34 to verify that the fans have the appropriate clearance distance on top of the cabinet.

Table 14 - Fan Housing Specifications

Model	Dimensions (HxWxD), approx.	Weight, approx.
RH40M	340 x 440 x 500 mm (13.4 x 17.3 x 19.7 in.)	20 kg (44.1 lb)
RH45M	380 x 490 x 550 mm (15.0 x 19.3 x 21.7 in.)	25 kg (55.1 lb)

1. Place the fan housing on the top plate of the drive, making sure the socket is on the same side as the aviation plug.
2. Secure the fan housing using M6 hardware (6 places).

   See Torque Requirements on page 119.
3. Connect the aviation plug located on top of the cabinet with the socket on the fan housing.

Figure 44 - Main Cooling Fan Housing

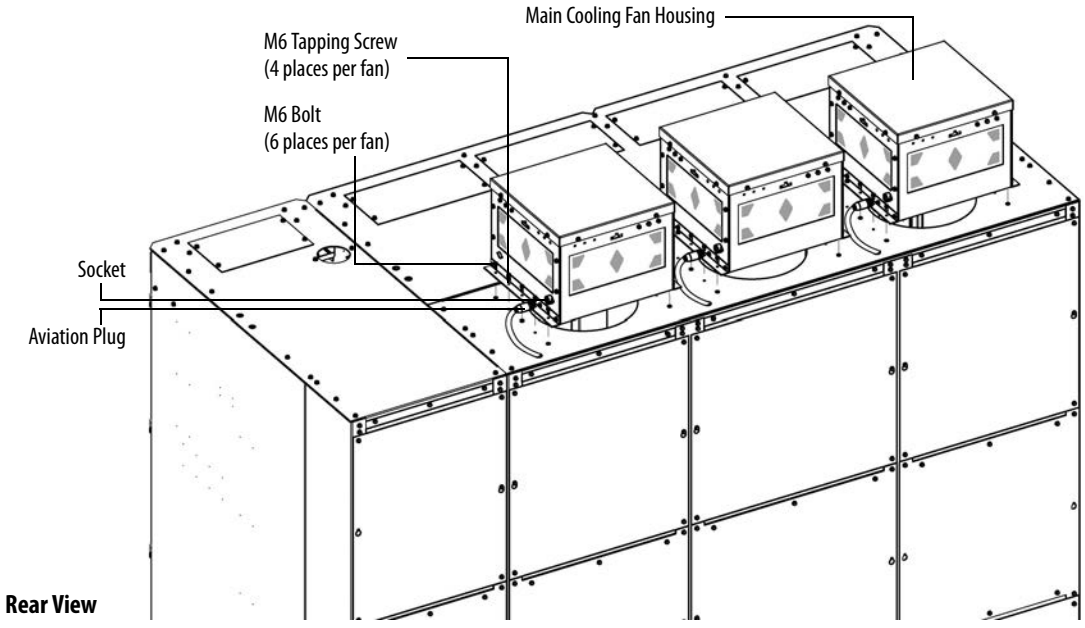


Table 15 - Power Module Specifications

Type	Output Rating (Amps)	Dimensions (HxWxD), approx.	Weight, approx.
Fixed-mounted	≤150 A	420 x 182 x 597 mm (16.5 x 7.2 x 23.5 in.)	30 kg (66.1 lb)
	151...200 A	420 x 260 x 619 mm (16.5 x 10.3 x 24.4 in.)	50 kg (110.2 lb)

Air Conditioning Sizing

If the drive is located in an enclosed space, install air conditioners for each drive. A general formula to calculate air conditioner power required:

$$\frac{DriveRating(kW) \times (1 - DriveEfficiency)}{3.5} = \text{Air Conditioning Size (tons)}$$

EXAMPLE For a 1000 kW drive with 96.5% efficiency:

$$\frac{1000 \times (1 - 0.96\dot{5})}{3.5} = 10 \text{ tons of AC required}$$

This is for a general estimate. Refer to the actual heat loss data to calculate air conditioning sizing. Contact the local Rockwell Automation office for actual data.

Notes:

Drive Electrical Installation (For IEC)

Introduction

The installation of all external power cables and control signal wiring is covered in this chapter. General electrical safety and installation guideline topics are also included. The basic activities include connecting the system ground cable, line and motor cables, control power, and all control signal wiring from the sources to the drive. See Figure 83 and Figure 84 for an overview of these connections.

Electrical interconnections are also required between cabinets that have shipped separately. These are described in Drive Electrical Interconnection (For IEC) on page 95.

Safety and Codes

SHOCK HAZARD: Connecting to potentially energized industrial control equipment can be dangerous. Severe injury or death can result from electrical shock, burn, or unintended actuation of control equipment. Hazardous voltages may exist in the cabinet even with the circuit breaker in the off position. Required practice is to disconnect and lock out control equipment from power sources, and confirm discharge of stored energy in capacitors. If it is necessary to work in the vicinity of energized equipment, the safety related work practices outlined in Electrical Safety requirements for Employee Work places must be followed. Before attempting any work, verify the system has been locked out and tested to have no potential.

Lockout and tagout the input circuit breaker before performing any electrical connection work. After the input circuit breaker cabinet doors are opened, immediately test the outgoing connections and any components connected to medium voltage with a live-line tool (hot stick) while wearing high voltage gloves. Pay special attention to any capacitors connected to medium voltage that can retain a charge for a period of time. Only after the equipment has been verified as isolated and de-energized can subsequent work be performed. Even though the input to the drive may be open, it is still possible for hazardous voltage to be present.

Refer to national and local safety guidelines for detailed procedures on how to safely isolate the equipment from hazards.

ATTENTION: The national and local electrical codes outline provisions for safely installing electrical equipment. Installation must comply with specifications regarding wire type, conductor sizes, branch circuit protection and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

Electrical Drawings

Before connecting any power cables or control signal wiring, review and understand the information contained in the project-specific Electrical Drawings.

They contain critical information such as:

- Minimum power cable insulation ratings and sizes
- Power terminal locations and designations
- Terminal block designations for all connections to external customer control signal wiring and control power supply cables.

The practice used within the PowerFlex 6000 electrical drawing is based on the IEC (International Electrotechnical Commission) standard. The symbols used to identify components on the drawings are international.

Device designations used on the drawings and labeling are explained on each drawing set.

Wiring identification uses a source/destination wire number convention on point-to-point multi-conductor wiring and in situations where the system is warranted. The wire-numbering system of unique, single numbers for multi-drop and point-to-point wiring continues to be used for general control and power wiring.

Wiring that connects between the sheets or that ends at one point and starts at another point on a drawing has an arrow and drawing reference to indicate the ongoing connection. The drawing reference indicates the sheet and the X/Y coordinates of the continuation point. The reference system is explained on a sheet in each drawing set. The unique wire numbering system serves as confirmation that the correct wire is being traced from sheet-to-sheet or across a drawing. Wires in multi-conductor cables are typically identified by color rather than by number. Abbreviations used to identify the colors on the drawings are fully identified on a sheet in the drawing set.

Grounding System Requirements

As a general guideline, the ground path must be of sufficiently low impedance and capacity that:

- the rise in potential of the drive ground point when subjected to a current of twice the rating of the supply should be no higher than 4 V over ground potential

- the current flowing into a ground fault is of sufficient magnitude to cause the protection to operate.

The general grounding point must be reliably connected with the grounding network.

Attach an external ground cable to the main ground bus, in compliance with applicable national and local electrical codes.

IMPORTANT The primary grounding cable must have a diameter of at least 50 mm^2 and meet all applicable national and local electrical codes.

Run the system ground cable separately from power and signal wiring so that faults:

- do not damage the grounding circuit
- will not interfere with or damage the protection or metering systems, or cause undue disturbance on power lines.

Power Cable Insulation Requirements

Incoming line power cable ratings are shown on the Electrical Drawings and reflect what would typically be supplied, based on line voltage rating.

All voltage ratings for outgoing motor cables shown are line-to-ground rated power-frequency voltages and line-to-line power-frequency voltages.

Table 16 - Cable Insulation Requirements for Outgoing Motor Cables

System Voltage (V, RMS)	Cable Insulation Rating (kV) - Motor Side	
	Line-to-Ground Rated Power Frequency Voltage U_0	Line-to-Line Rated Power Frequency Voltage U
3000	≥3.6	≥6
3300	≥3.6	≥6
6000	≥6.0	≥10
6600	≥6.0	≥10
10,000	≥8.7	≥15

Select cables of appropriate voltage classes when the incoming line grid-side voltage class is different from the outgoing line motor-side voltage class.

Standard power cable ratings commercially available can vary in different regions around the world. Cable must meet the minimum line-to-ground and line-to-line requirements.

IMPORTANT Follow the recommended field power cabling insulation levels to help ensure trouble-free start-up and operation. The cable insulation level must be increased over that which would be supplied for an across-the-line application with the same rated line-to-line voltage.

Power Cable Design Considerations

Use fire retardant cables for the drive input/output connections.

Shielded or unshielded cable can be used based on the criteria considered by the distribution system designer and national and local electrical codes.

If shielded power cables are used, connect the shield of the main input/output power cables with the general grounding point of the drive. Ground the drive output protective grounding connection separately, and only at the drive side.

Comply with the maximum tensile stress and the minimum curvature radius recommended by the cable manufacturer.

Do not bundle the input/output cables of the drive together.

The power cable tray must not be less than 300 mm (12 in.).

There must be no gaps where the conduit connects to the cabinet and the ground bond must be less than 0.1 ohms. Spacing between wire groups is the recommended minimum for parallel runs of approximately 61 m (200 ft) or less.

IMPORTANT The power cable distance from the drive to the motor must not be longer than 300 m. If the power cable exceeds 300 m, contact the factory. Configurations can be provided for longer cable distances, but must be specified at the time of order.

All input and output power wiring, control wiring or conduit must be brought through the conduit entrance holes of the cabinet. Use appropriate connectors to maintain the environmental rating of the cabinet.

Motor Cable Sizing

Voltage drop in motor leads may adversely affect motor starting and running performance. Installation and application requirements may dictate that larger wire sizes than indicated in national and local electrical codes are used.

Wire sizes must be selected individually, observing all applicable safety and national and local electrical codes. The minimum permissible wire size does not necessarily result in the best operating economy. The minimum recommended size for the wires between the drive and the motor is the same as that used if a main voltage source connection to the motor was used. The distance between the drive and motor can affect the size of the conductors used.

Consult the Electrical Drawings and appropriate national and local electrical codes to determine correct power wiring. If assistance is needed, contact your local Rockwell Automation Sales Office.

Control Signal Wiring Design Considerations

Use shielded cables for all the analog and digital control cables.

Steel conduit or a cable tray can be used for all PowerFlex 6000 drive power or control wiring; however, use only steel conduit for all signal wiring.

ATTENTION: Steel conduit is required for all control and signal circuits when the drive is installed in European Union countries.

Wires for digital and analog signals must be routed separately.

Control cables and power cables must be routed separately; the distance between the control cable tray and the power cable tray must not be less than 300 mm.

If the control cable must pass through the power cable tray, the angle between the cable trays must be as close to 90° as possible.

Do not mix AC and DC wires in the same cable bundle.

General Wire Categories on page 121 identifies general wire categories for installing the PowerFlex 6000 drive. Each category has an associated wire group number that is used to identify the required wire. Application and signal examples, along with the recommended type of cable for each group, are provided. A matrix providing the recommended minimum spacing between different wire groups which run in the same tray or in a separate conduit is also provided.

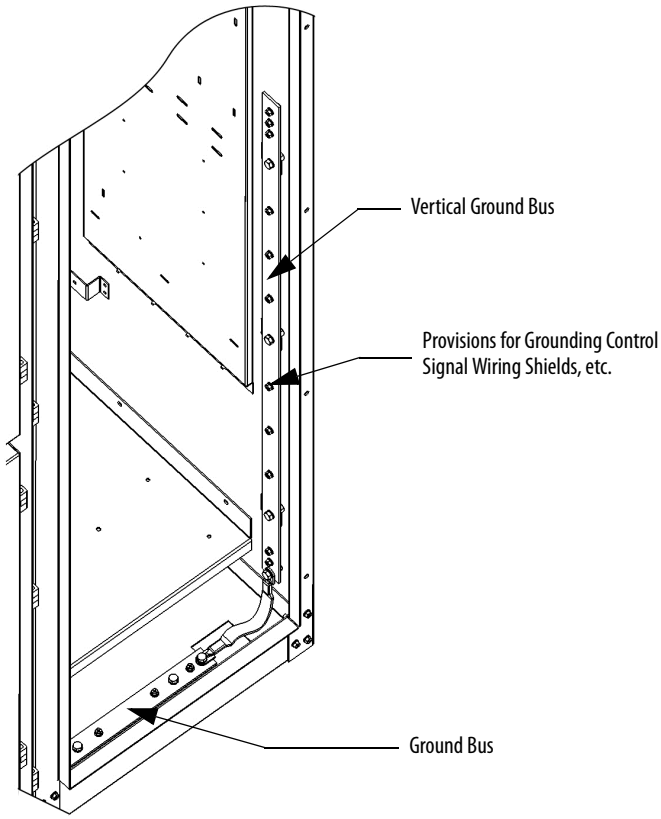
Control Signal Wire Shield Grounding

Guidelines for Drive Signal and Safety Grounds: when using interface cables carrying signals, where the frequency does not exceed 1 MHz, for communications with the drive, follow these general guidelines:

- Ground screen mesh around the entire circumference, rather than forming a pigtail grounded only at one point.
- For coaxial cables with a single conductor surrounded by a mesh screen, ground the screen at both ends.
- When using a multi-layer screened cable (that is, a cable with both a mesh screen and a metal sheath or some form of foil), there are two alternative methods:
  - Ground the mesh screen at both ends to the metal sheath. The metal sheath or foil (known as the drain) should, unless otherwise specified, be grounded at one end only, again, as specified above, at the receiver end or the end that is physically closest to the main equipment ground bus
  - Leave the metal sheath or foil insulated from ground, and ground the other conductors and the mesh cable screen at one end only, as stated above.

Grounding provisions for control signal wiring is shown in Figure 45.

Figure 45 - Vertical Ground Bus in LV Cabinet

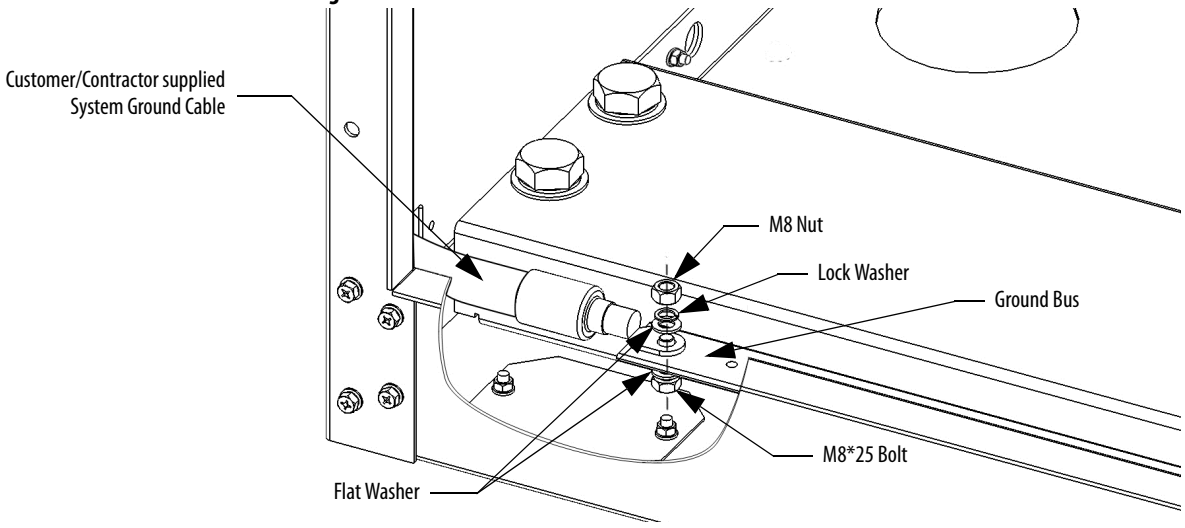


Electrical Installation Summary

Connect the System Ground Cable

The drive ground bus runs along the bottom of the drive at the front. The ground bus is accessible at the bottom of the front of each drive cabinet when the cabinet door is opened. Connect the system ground cable to the drive ground bus (Figure 46).

Figure 46 - Ground Cable Connection in the Isolation Transformer Cabinet



IMPORTANT If an optional Bypass cabinet is supplied, the system ground cable connection is in the Bypass cabinet. Refer to publication 6000-UM002_-EN-P.

Megger Test of Power Cables

Before connecting the incoming line and outgoing motor power cables, follow standard industry practice to verify the integrity of the power cable insulation from the input breaker to the drive and from the drive to the motor.

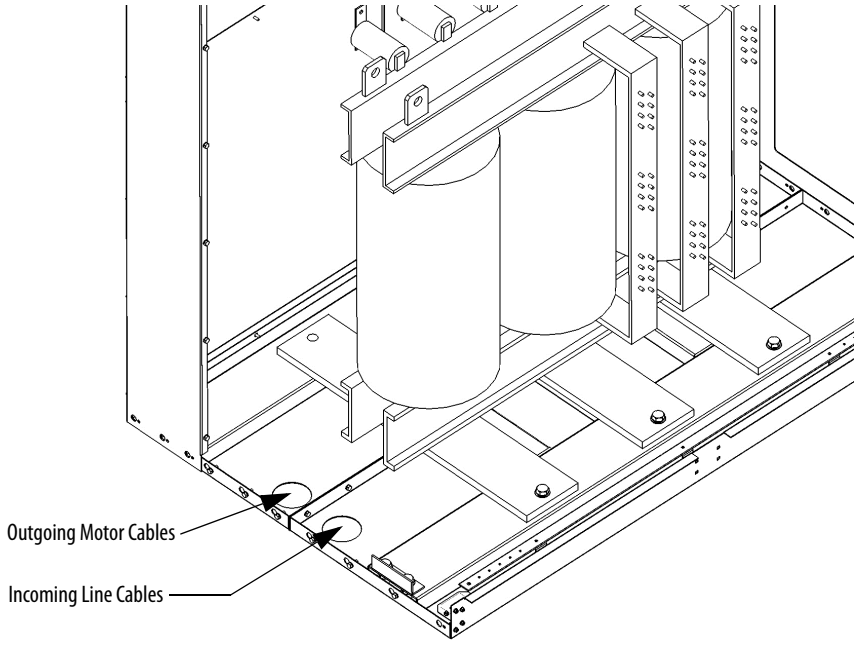
Connect Incoming Line and Outgoing Motor Power Cables

The installer must ensure that all power connections are in accordance with national and local electrical codes.

Each drive is equipped with provisions for bottom power cable entry as standard. Provisions for top power cable entry can also be provided. This must be specified at the time of order.

Cable access openings are located on the bottom plate of the connection cabinet identified by the customer specific Dimension Drawing.

Figure 47 - Power Cable Entry Locations in the Isolation Transformer Cabinet



The drive is supplied with the following provisions for power cable lugs.

Table 17 - Power Terminals

Incoming Line Cable Connections	L11	L12	L13
Outgoing Motor Cable Connections	U	V	W

IMPORTANT If an optional Bypass cabinet is supplied, the incoming line and outgoing motor cable connections are in the Bypass cabinet.
Refer to publication 6000-UM002_-EN-P.

Figure 48 shows typical connection points for the primary entrance/exit cable.

Connect the three-phase medium voltage inputs L11, L12, and L13 to the user-provided input three-phase AC power.

Connect three-phase medium voltage inputs U, V, and W to the user-provided three-phase asynchronous motor.

Cable clamps are provided in the cabinet to aid in routing and supporting the incoming line and outgoing motor power cables.

Figure 48 - Isolation Transformer Cabinet (Fixed-mounted Power Module Configuration without Bypass Cabinet)

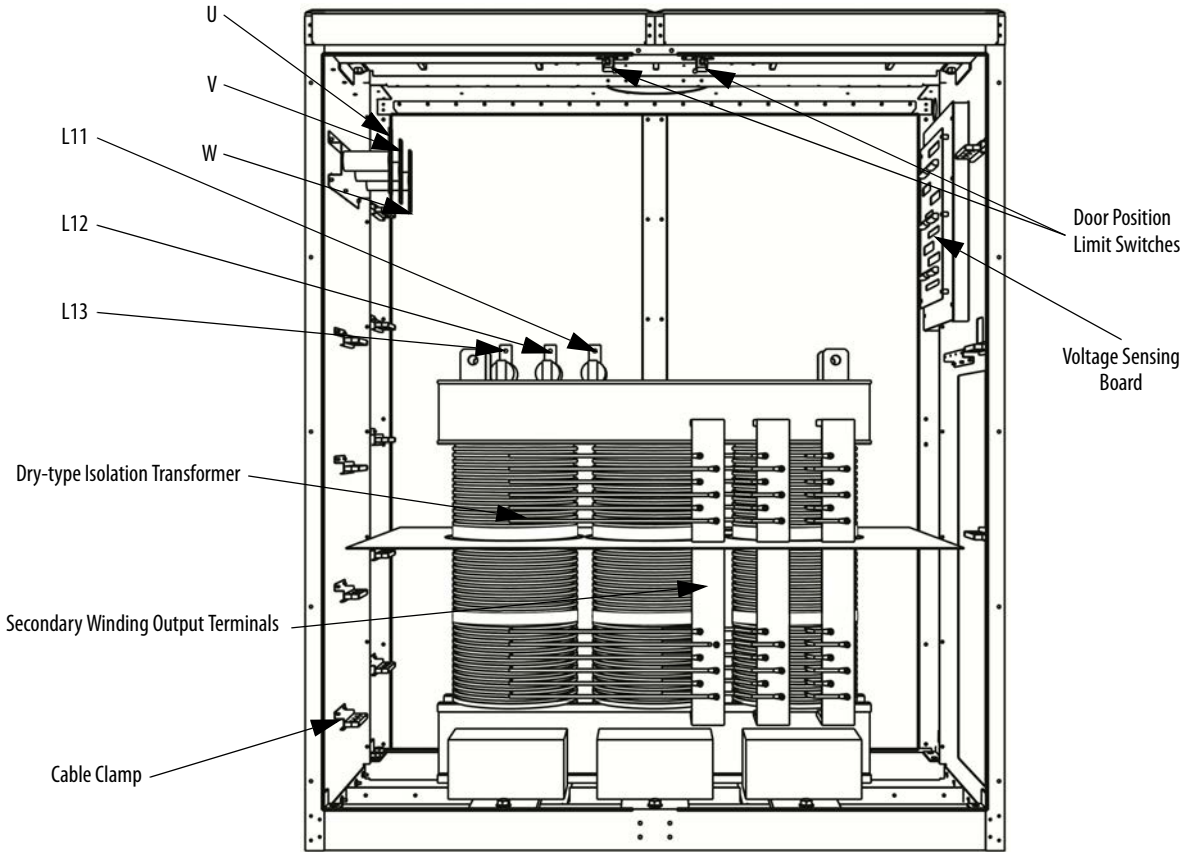
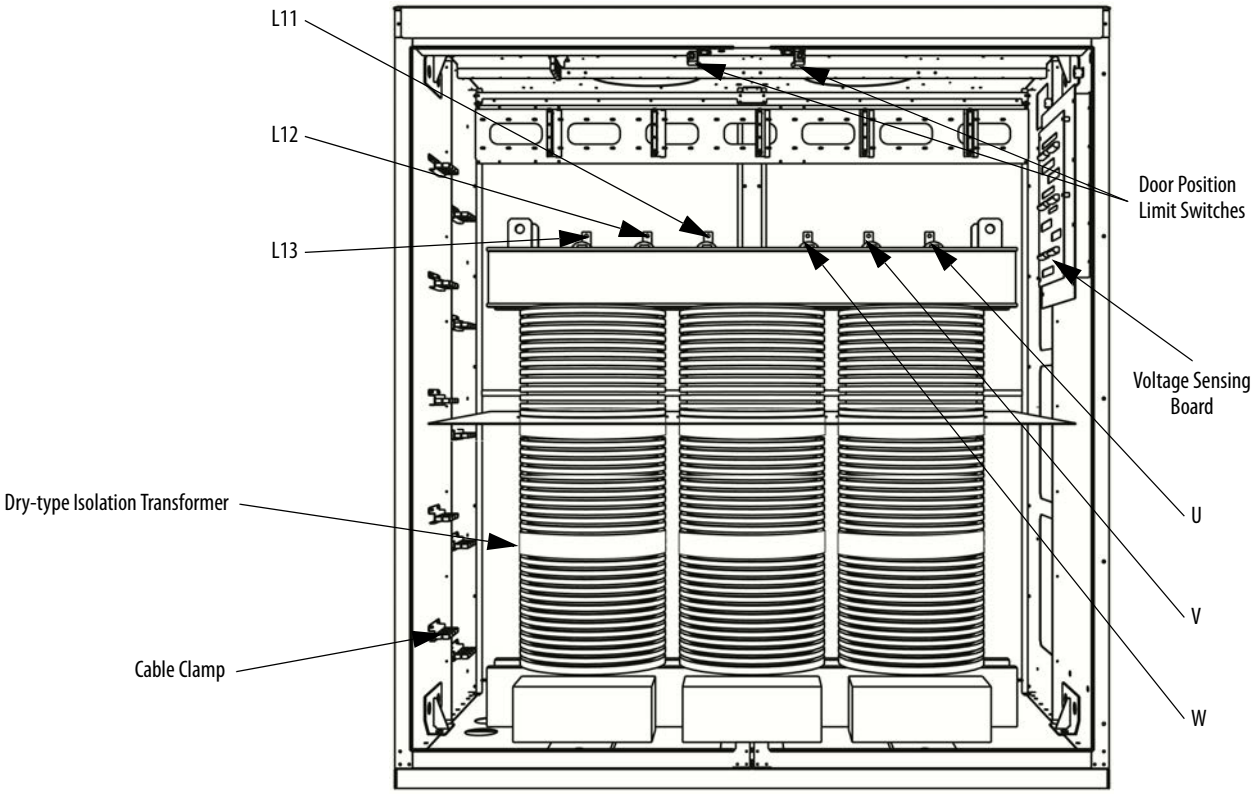


Figure 49 - Isolation Transformer Cabinet (Drawout Power Module Configuration without Bypass Cabinet)



Connect Control Power Wiring

Introduction

Externally supplied control power is required to operate the drive. The standard voltage supported is 220V AC/50 Hz. The other typical phase voltages of 230V AC, 110V AC, and 120V AC are also supported (50/60 Hz), but need to be specified at the time of order. A minimum of 3 kVA is required to supply the control circuit.

Wiring Routing and Connection

The control power wiring enters the drive through an opening in the bottom plate of the LV Control Cabinet.

Figure 50 - Control Power Wiring Opening (Fixed-mounted Power Module Configuration)

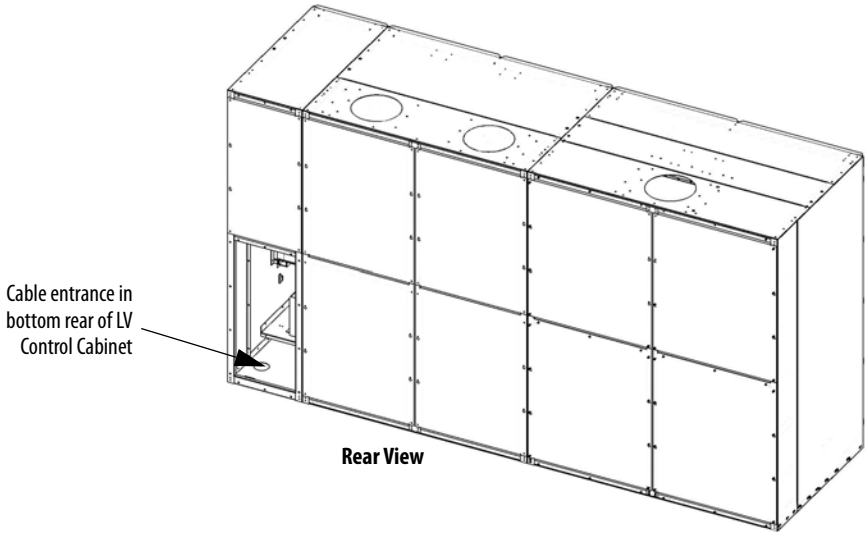
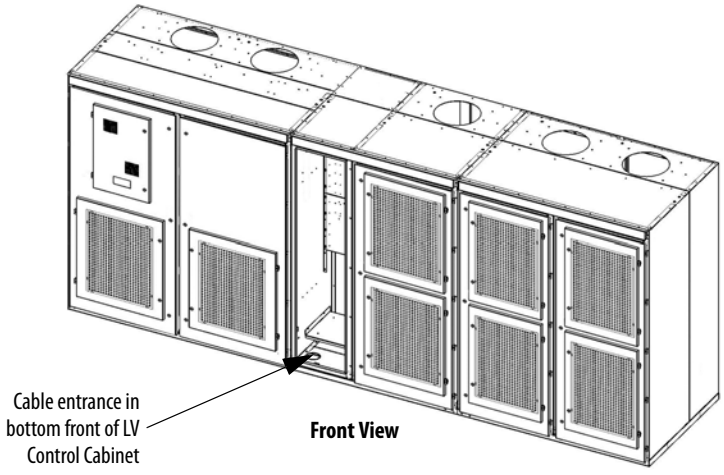
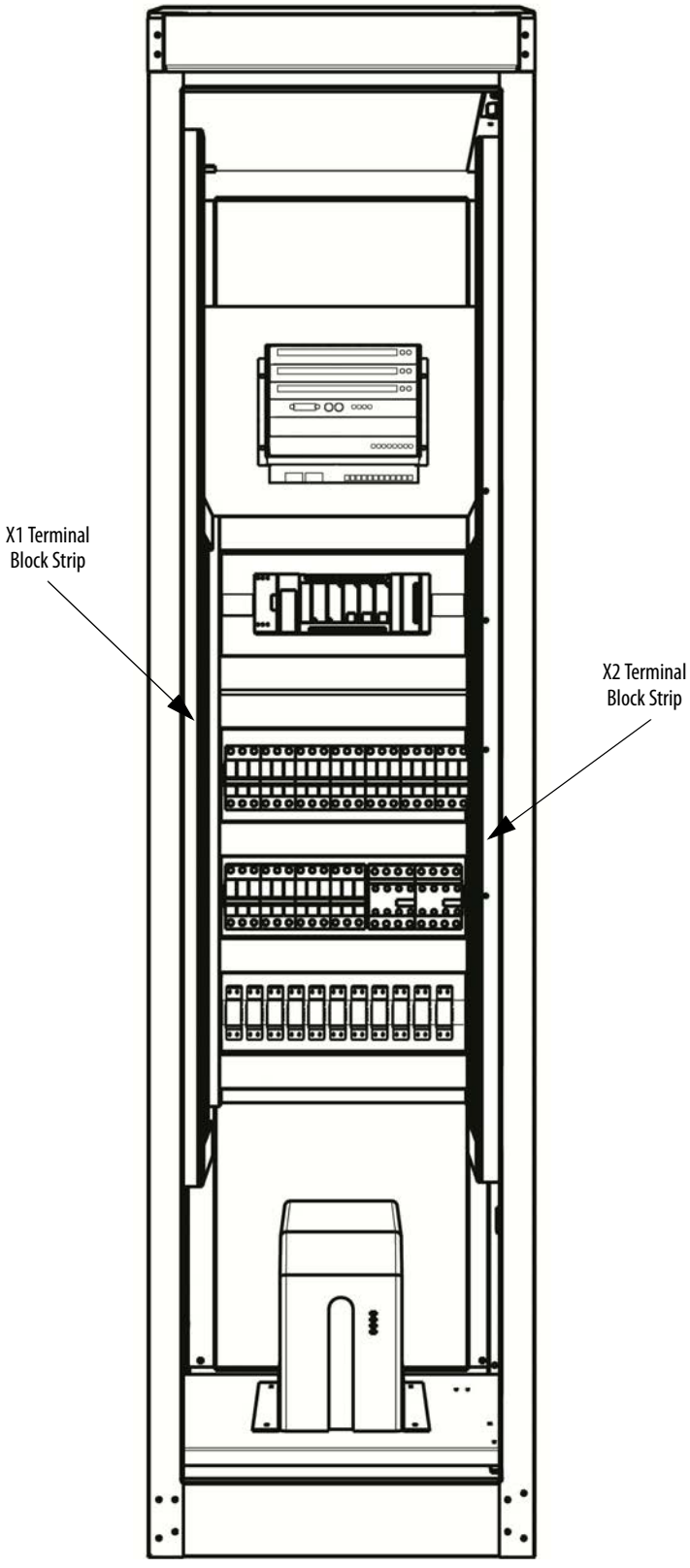


Figure 51 - Control Power Wiring Opening (Drawout Power Module Configuration)



The control power wiring terminates to the X1 terminal block strip on the left side of the LV Control cabinet (Figure 52). See Figure 83 or Figure 84 for general overview. Refer to Electrical Drawings for actual connection points.

Figure 52 - Terminal Block Strip locations



Connect External Control Signal Wiring

Introduction

This section summarizes the control signal wiring from the remote DCS/PLC or discrete control to the drive. General connections are detailed in Power Cabling and Control Signal Wiring Details (For IEC) on page 145. Refer to the Electrical Drawings for connection information specific to the drive being installed.

Analog and Digital I/O Overview

Four 4...20 mA analog input signals. One may be used for DCS with rotating speed setting and three for backup. For detailed information, see Table 57 and Table 58 on page 149.

Two 4...20 mA analog output signals for indication signals such as output motor current and frequency. See Table 57 and Table 58 on page 149.

Sixteen passive dry contact inputs (internal 24V DC power supply) start/stop and reset controls. For detailed information, see Table 57 and Table 58 on page 149. These inputs are scalable depending on user requirements.

Twenty dry contact outputs: including nine active dry contact outputs with a capacity of not more than 20W for indication (backup), and 11 passive dry contact outputs powered by the drive with a capacity of 220V AC/5A for DCS status/fault indication. For detailed information, see Table 57 and Table 58 on page 149. These outputs are scalable depending on user requirements.

The drive is provided with dry contact outputs (1 N.O. with a capacity of 220V AC/5 A, valid when closed) which trigger the user-provided medium voltage circuit breaker for interlock with the user-provided medium voltage switch cabinet. For detailed information, see Table 57 and Table 58 on page 149.

Ethernet interface is supplied as standard (other communication interfaces including Modbus and Profibus are provided as options). For detailed information, see Figure 86 on page 148.

Wiring Routing and Connection

The control signal wiring enters the drive through the same opening as the control power wiring in the LV Control Cabinet (Figure 50 or Figure 51).

The wiring terminates either to the X1 or X2 terminal block strips on either side of the LV Control cabinet (Figure 52). See Figure 83 or Figure 84 for general information. Refer to Electrical Drawings for actual connection points.

Connect Electrical Safety Interlock Circuit to Input Circuit Breaker

Introduction

The electrical safety interlock circuit is part of the overall control signal wiring activity. However, it is mentioned separately in this document due to its critical importance related to the safe operation of the drive and personnel safety.

The circuits connected between the drive and the input circuit breaker:

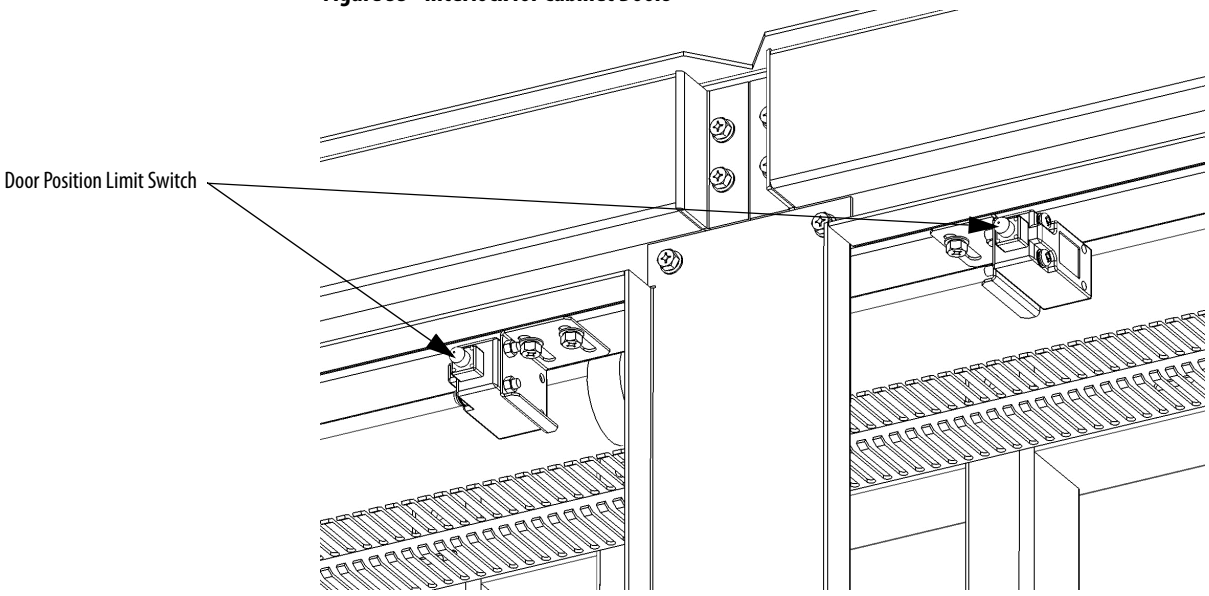
- allow the drive to trip the input circuit breaker if a drive cabinet door is opened. This applies to the cabinet doors where medium voltage is present. The LV Control cabinet door can be opened while the drive is energized.
- allow the drive to prevent the input circuit breaker from closing when required.
- indicate to the drive when the input circuit breaker is closed.

MV Door Safety Interlock

If the MV cabinet door is opened, the Allen-Bradley Guardmaster Limit Switch (440P-CRPS11D4B) on the cabinet door will actuate. The drive will send a trip signal to the input circuit breaker to disconnect the medium voltage power supply to the drive.

ATTENTION: The door position interlock is a safety feature. It must not be used solely as a part of the plant operation process to ensure the drive has been disconnected from input medium voltage. Keep the medium voltage doors locked as standard practice. Always go to the input circuit breaker feeding the drive to verify if it is open. Lock out and tagout the input circuit breaker before performing any work on the drive or bypass units.

Figure 53 - Interlock for Cabinet Doors



When the doors of the Power Module/LV Control Cabinet or Isolation Transformer Cabinet are not closed, when the drive is being maintained or when the control power switch is not closed, the drive will not send a signal allowing the input circuit breaker to close; this is wired as a permissive contact in the input circuit breaker's closing circuit so that the input circuit breaker cannot close.

Wire Routing and Connection

The electrical safety interlock control signal wiring enters the drive through the same opening as the control power wiring in the bottom of the LV Control Cabinet (Figure 50 or Figure 51).

The wiring terminates to the X1 terminal block strip on the right side of the LV Control cabinet (Figure 52). See Figure 83 or Figure 84 for general information. Refer to Electrical Drawings for actual connection points.

Drive Electrical Installation (For UL)

Introduction

The installation of all external power cables and control signal wiring is covered in this chapter. General electrical safety and installation guideline topics are also included. The basic activities include connecting the system ground cable, line and motor cables, control power, and all control signal wiring from the sources to the drive. See Figure 87 and Figure 88 for an overview of these connections.

Electrical interconnections are also required between cabinets that have shipped separately. These are described in Drive Electrical Interconnection (For UL) on page 107.

Safety and Codes

SHOCK HAZARD: Connecting to potentially energized industrial control equipment can be dangerous. Severe injury or death can result from electrical shock, burn, or unintended actuation of control equipment. Hazardous voltages may exist in the cabinet even with the circuit breaker in the off position. Required practice is to disconnect and lock out control equipment from power sources, and confirm discharge of stored energy in capacitors. If it is necessary to work in the vicinity of energized equipment, the safety related work practices outlined in Electrical Safety requirements for Employee Work places must be followed. Before attempting any work, verify the system has been locked out and tested to have no potential.

Lockout and tagout the input circuit breaker before performing any electrical connection work. After the input circuit breaker cabinet doors are opened, immediately test the outgoing connections and any components connected to medium voltage with a live-line tool (hot stick) while wearing high voltage gloves. Pay special attention to any capacitors connected to medium voltage that can retain a charge for a period of time. Only after the equipment has been verified as isolated and de-energized can subsequent work be performed. Even though the input to the drive may be open, it is still possible for hazardous voltage to be present.

Refer to national and local safety guidelines for detailed procedures on how to safely isolate the equipment from hazards.

ATTENTION: The national and local electrical codes outline provisions for safely installing electrical equipment. Installation must comply with specifications regarding wire type, conductor sizes, branch circuit protection and disconnect devices. Failure to do so may result in personal injury and/or equipment damage.

Electrical Drawings

Before connecting any power cables or control signal wiring, review and understand the information contained in the project-specific Electrical Drawings.

They contain critical information such as:

- Minimum power cable insulation ratings and sizes
- Power terminal locations and designations
- Terminal block designations for all connections to external customer control signal wiring and control power supply cables.

The practice used within the PowerFlex 6000 electrical drawing is based on the UL (Underwriters Laboratories) standard.

Device designations used on the drawings and labeling are explained on each drawing set.

Wiring identification uses a source/destination wire number convention on point-to-point multi-conductor wiring and in situations where the system is warranted. The wire-numbering system of unique, single numbers for multi-drop and point-to-point wiring continues to be used for general control and power wiring.

Wiring that connects between the sheets or that ends at one point and starts at another point on a drawing has an arrow and drawing reference to indicate the ongoing connection. The drawing reference indicates the sheet and the X/Y coordinates of the continuation point. The reference system is explained on a sheet in each drawing set. The unique wire numbering system serves as confirmation that the correct wire is being traced from sheet-to-sheet or across a drawing. Wires in multi-conductor cables are typically identified by color rather than by number. Abbreviations used to identify the colors on the drawings are fully identified on a sheet in the drawing set.

Grounding System Requirements

As a general guideline, the ground path must be of sufficiently low impedance and capacity that:

- the rise in potential of the drive ground point when subjected to a current of twice the rating of the supply should be no higher than 4 V over ground potential
- the current flowing into a ground fault is of sufficient magnitude to cause the protection to operate.

The general grounding point must be reliably connected with the grounding network.

Attach an external ground cable to the main ground bus, in compliance with applicable national and local electrical codes.

IMPORTANT The primary grounding cable must have a diameter of at least 50 mm^2 and meet all applicable national and local electrical codes.

Run the system ground cable separately from power and signal wiring so that faults:

- do not damage the grounding circuit
- will not interfere with or damage the protection or metering systems, or cause undue disturbance on power lines.

Power Cable Insulation Requirements

Incoming line power cable ratings are shown on the Electrical Drawings and reflect what would typically be supplied, based on line voltage rating.

All voltage ratings for outgoing motor cables shown are line-to-ground rated power-frequency voltages and line-to-line power-frequency voltages.

Table 18 - Cable Insulation Requirements for Outgoing Motor Cables

System Voltage (RMS)	Cable Insulation Rating (kV) - Motor Side	
	Voltage Rating	Insulation Level
2.3/2.4 kV	5	133%
4.0/4.16 kV	5	133%
6.0 kV	8	133%
6.3 kV	8	133%
6.6 kV	8	133%

Select cables of appropriate voltage classes when the incoming line grid-side voltage class is different from the outgoing line motor-side voltage class.

Standard power cable ratings commercially available can vary in different regions around the world. Cable must meet the minimum line-to-ground and line-to-line requirements.

IMPORTANT Follow the recommended field power cabling insulation levels to help ensure trouble-free start-up and operation. The cable insulation level must be increased over that which would be supplied for an across-the-line application with the same rated line-to-line voltage.

Power Cable Design Considerations

Use fire retardant cables for the drive input/output connections.

Shielded or unshielded cable can be used based on the criteria considered by the distribution system designer and national and local electrical codes.

If shielded power cables are used, connect the shield of the main input/output power cables with the general grounding point of the drive. Ground the drive output protective grounding connection separately, and only at the drive side.

Comply with the maximum tensile stress and the minimum curvature radius recommended by the cable manufacturer.

Do not bundle the input/output cables of the drive together.

The power cable tray must not be less than 300 mm (12 in.).

There must be no gaps where the conduit connects to the cabinet and the ground bond must be less than 0.1 ohms. Spacing between wire groups is the recommended minimum for parallel runs of approximately 61 m (200 ft) or less.

IMPORTANT The power cable distance from the drive to the motor must not be longer than 300 m. If the power cable exceeds 300 m, contact the factory. Configurations can be provided for longer cable distances, but must be specified at the time of order.

All input and output power wiring, control wiring or conduit must be brought through the conduit entrance holes of the cabinet. Use appropriate connectors to maintain the environmental rating of the cabinet.

Motor Cable Sizing

Voltage drop in motor leads may adversely affect motor starting and running performance. Installation and application requirements may dictate that larger wire sizes than indicated in national and local electrical codes are used.

Wire sizes must be selected individually, observing all applicable safety and national and local electrical codes. The minimum permissible wire size does not necessarily result in the best operating economy. The minimum recommended size for the wires between the drive and the motor is the same as that used if a main voltage source connection to the motor was used. The distance between the drive and motor can affect the size of the conductors used.

Consult the Electrical Drawings and appropriate national and local electrical codes to determine correct power wiring. If assistance is needed, contact your local Rockwell Automation Sales Office.

Control Signal Wiring Design Considerations

Use shielded cables for all the analog and digital control cables.

Steel conduit or a cable tray can be used for all PowerFlex 6000 drive power or control wiring; however, use only steel conduit for all signal wiring.

ATTENTION: Steel conduit is required for all control and signal circuits when the drive is installed in European Union countries.

Wires for digital and analog signals must be routed separately.

Control cables and power cables must be routed separately; the distance between the control cable tray and the power cable tray must not be less than 300 mm.

If the control cable must pass through the power cable tray, the angle between the cable trays must be as close to 90° as possible.

Do not mix AC and DC wires in the same cable bundle.

General Wire Categories on page 121 identifies general wire categories for installing the PowerFlex 6000 drive. Each category has an associated wire group number that is used to identify the required wire. Application and signal examples, along with the recommended type of cable for each group, are provided. A matrix providing the recommended minimum spacing between different wire groups which run in the same tray or in a separate conduit is also provided.

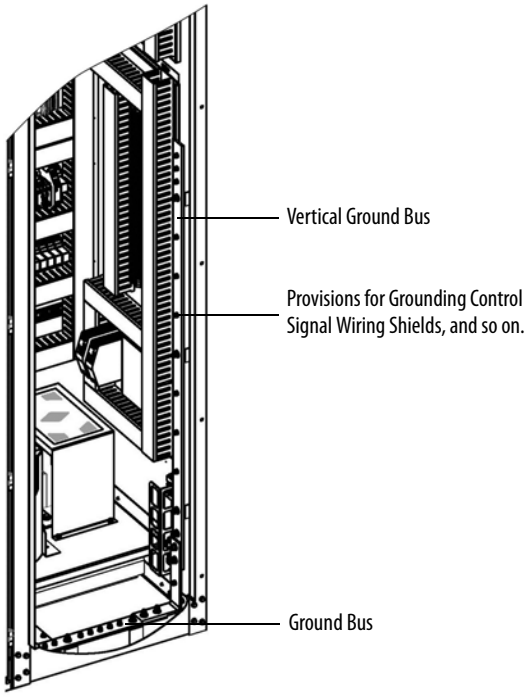
Control Signal Wire Shield Grounding

Guidelines for Drive Signal and Safety Grounds: when using interface cables carrying signals, where the frequency does not exceed 1 MHz, for communications with the drive, follow these general guidelines:

- Ground screen mesh around the entire circumference, rather than forming a pigtail grounded only at one point.
- For coaxial cables with a single conductor surrounded by a mesh screen, ground the screen at both ends.
- When using a multi-layer screened cable (that is, a cable with both a mesh screen and a metal sheath or some form of foil), there are two alternative methods:
  - Ground the mesh screen at both ends to the metal sheath. The metal sheath or foil (known as the drain) should, unless otherwise specified, be grounded at one end only, again, as specified above, at the receiver end or the end that is physically closest to the main equipment ground bus
  - Leave the metal sheath or foil insulated from ground, and ground the other conductors and the mesh cable screen at one end only, as stated above.

Grounding provisions for control signal wiring is shown in Figure 54.

Figure 54 - Vertical Ground Bus in LV Cabinet

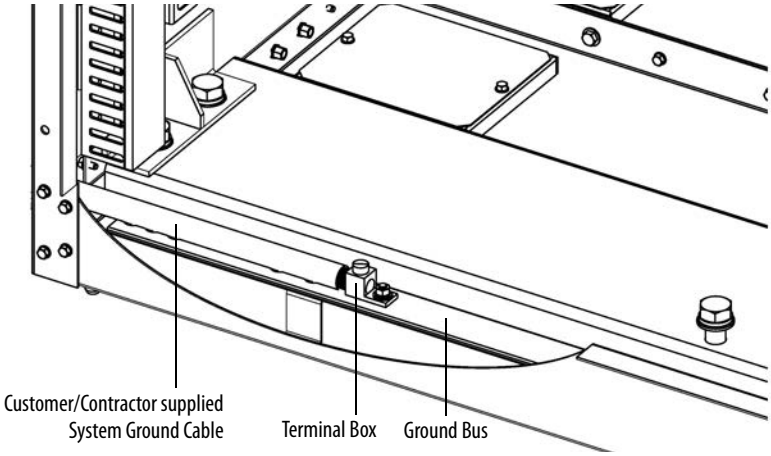


Electrical Installation Summary

Connect the System Ground Cable

The drive ground bus runs along the bottom of the drive at the front. The ground bus is accessible at the bottom of the front of each drive cabinet when the cabinet door is opened. Connect the system ground cable to the drive ground bus (Figure 55).

Figure 55 - Ground Cable Connection in the Isolation Transformer Cabinet



IMPORTANT If an optional Bypass cabinet is supplied, the system ground cable connection is in the Bypass cabinet. Refer to publication 6000-UM002_-EN-P.

Megger Test of Power Cables

Before connecting the incoming line and outgoing motor power cables, follow standard industry practice to verify the integrity of the power cable insulation from the input breaker to the drive and from the drive to the motor.

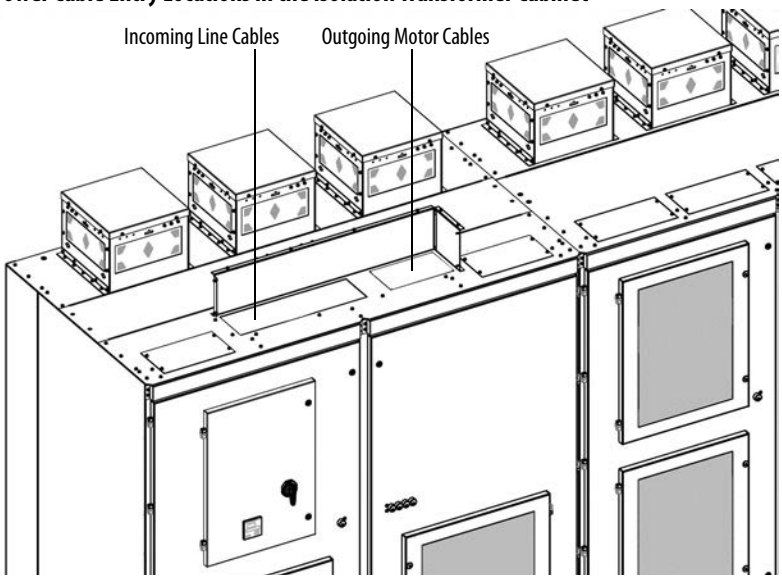
Connect Incoming Line and Outgoing Motor Power Cables

The installer must ensure that all power connections are in accordance with national and local electrical codes.

Each drive is equipped with provisions for bottom power cable entry as standard. Provisions for top power cable entry can also be provided. This must be specified at the time of order.

Cable access openings are located on the bottom plate of the connection cabinet identified by the customer specific Dimension Drawing.

Figure 56 - Power Cable Entry Locations in the Isolation Transformer Cabinet



The drive is supplied with the following provisions for power cable lugs.

Table 19 - Power Terminals

Incoming Line Cable Connections	L1	L2	L3
Outgoing Motor Cable Connections	U	V	W

IMPORTANT If an optional Bypass cabinet is supplied, the incoming line and outgoing motor cable connections are in the Bypass cabinet.
Refer to publication 6000-UM002_-EN-P.

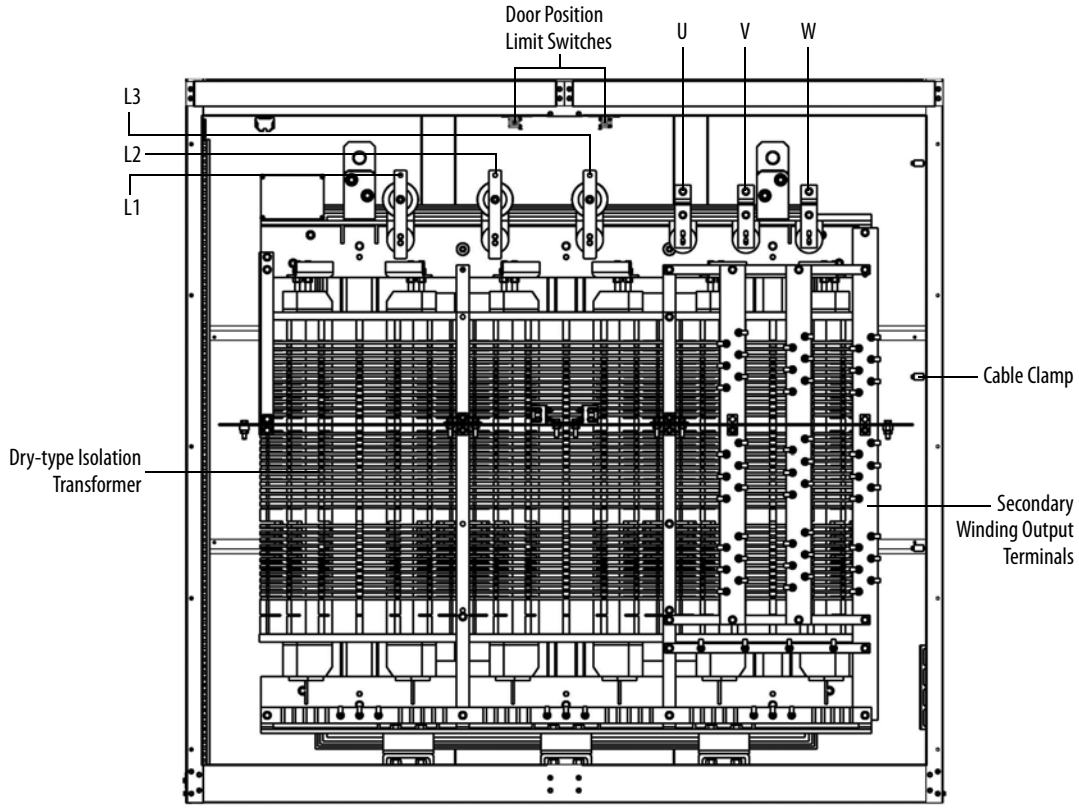
Figure 57 shows typical connection points for the primary entrance/exit cable.

Connect the three-phase medium voltage inputs L1, L2, and L3 to the user-provided input three-phase AC power.

Connect three-phase medium voltage inputs U, V, and W to the user-provided three-phase asynchronous motor.

Cable clamps are provided in the cabinet to aid in routing and supporting the incoming line and outgoing motor power cables.

Figure 57 - Isolation Transformer Cabinet (Fixed-mounted Power Module Configuration without Bypass Cabinet)



Connect Control Power Wiring

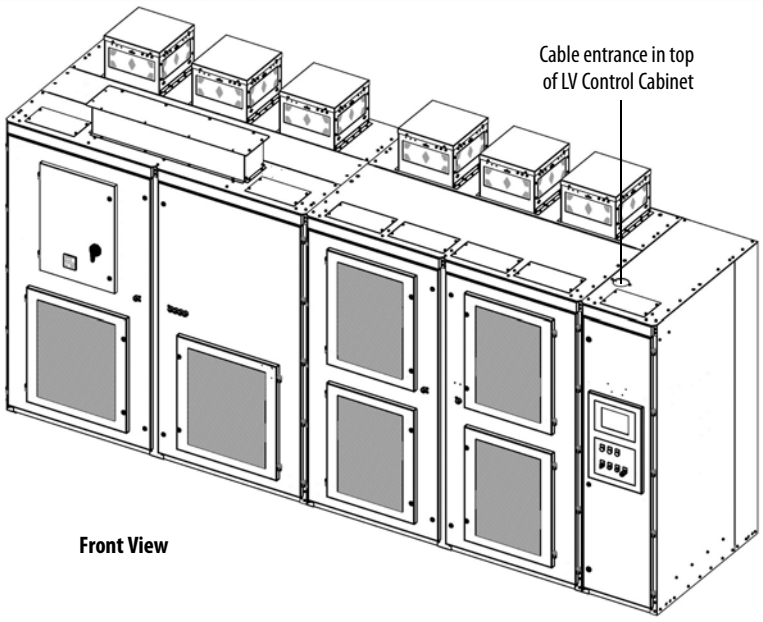
Introduction

Externally supplied control power is required to operate the drive. The standard voltage supported is 220V AC/50 Hz. The other typical phase voltages of 230V AC, 110V AC, and 120V AC are also supported (50/60 Hz), but need to be specified at the time of order. A minimum of 3 kVA is required to supply the control circuit.

Wiring Routing and Connection

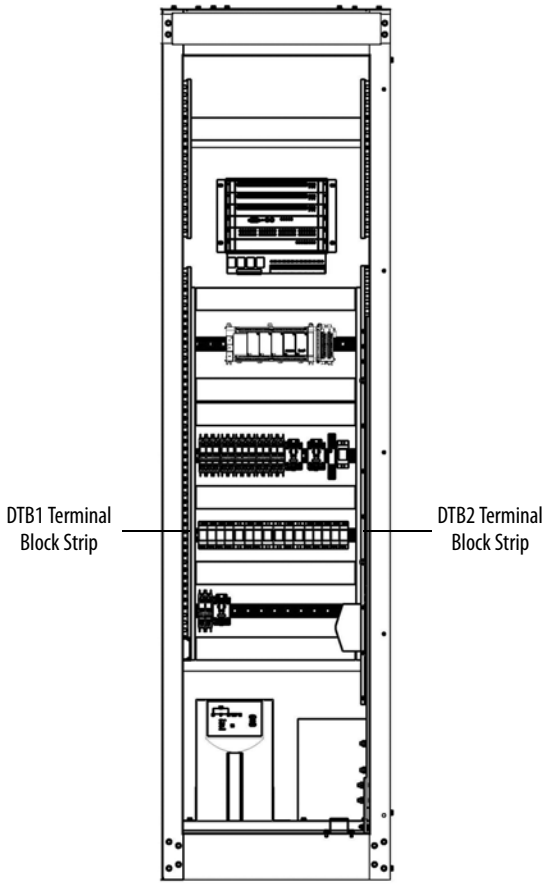
The control power wiring enters the drive through an opening in the bottom plate of the LV Control Cabinet.

Figure 58 - Control Power Wiring Opening (Fixed-mounted Power Module Configuration)



The control power wiring terminates to the DTB1 terminal block strip on the left side of the LV Control cabinet (Figure 59). See Figure 87 or Figure 88 for general overview. Refer to Electrical Drawings for actual connection points.

Figure 59 - Terminal Block Strip locations



Connect External Control Signal Wiring

Introduction

This section summarizes the control signal wiring from the remote DCS/PLC or discrete control to the drive. General connections are detailed in Power Cabling and Control Signal Wiring Details (For UL) on page 151. Refer to the Electrical Drawings for connection information specific to the drive being installed.

Analog and Digital I/O Overview

Four 4...20 mA analog input signals. One may be used for DCS with rotating speed setting and three for backup. For detailed information, see Table 59 and Table 60 on page 153.

Two 4...20 mA analog output signals for indication signals such as output motor current and frequency. see Table 59 and Table 60 on page 153.

Sixteen passive dry contact inputs (internal 24V DC power supply) start/stop and reset controls. For detailed information, see Table 59 and Table 60 on page 153. These inputs are scalable depending on user requirements.

Twenty dry contact outputs: including nine active dry contact outputs with a capacity of not more than 20W for indication (backup), and 11 passive dry contact outputs powered by the drive with a capacity of 220V AC/5A for DCS status/fault indication. For detailed information, see Table 59 and Table 60 on page 153. These outputs are scalable depending on user requirements.

The drive is provided with dry contact outputs (1 N.O. with a capacity of 220V AC/5 A, valid when closed) which trigger the user-provided medium voltage circuit breaker for interlock with the user-provided medium voltage switch cabinet. For detailed information, see Table 59 and Table 60 on page 153.

Ethernet interface is supplied as standard (other communication interfaces including Modbus and Profibus are provided as options).

Wiring Routing and Connection

The control signal wiring enters the drive through the same opening as the control power wiring in the LV Control Cabinet (Figure 58).

The wiring terminates either to the DTB1 or DTB2 terminal block strips on either side of the LV Control cabinet (Figure 59). See Figure 87 or Figure 88 for general information. Refer to Electrical Drawings for actual connection points.

Connect Electrical Safety Interlock Circuit to Input Circuit Breaker

Introduction

The electrical safety interlock circuit is part of the overall control signal wiring activity. However, it is mentioned separately in this document due to its critical importance related to the safe operation of the drive and personnel safety.

The circuits connected between the drive and the input circuit breaker:

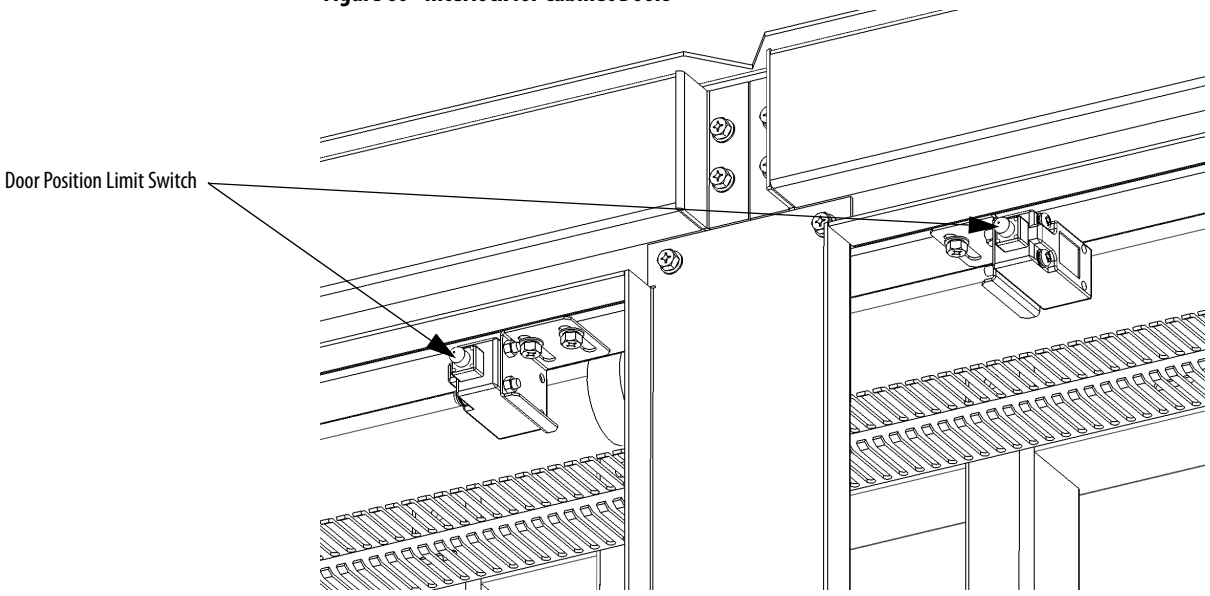
- allow the drive to trip the input circuit breaker if a drive cabinet door is opened. This applies to the cabinet doors where medium voltage is present. The LV Control cabinet door can be opened while the drive is energized.
- allow the drive to prevent the input circuit breaker from closing when required.
- indicate to the drive when the input circuit breaker is closed.

MV Door Safety Interlock

If the MV cabinet door is opened, the Allen-Bradley Guardmaster Limit Switch (440P-CRPS11D4B) on the cabinet door will actuate. The drive will send a trip signal to the input circuit breaker to disconnect the medium voltage power supply to the drive.

ATTENTION: The door position interlock is a safety feature. It must not be used solely as a part of the plant operation process to ensure the drive has been disconnected from input medium voltage. Keep the medium voltage doors locked as standard practice. Always go to the input circuit breaker feeding the drive to verify if it is open. Lock out and tagout the input circuit breaker before performing any work on the drive or bypass units.

Figure 60 - Interlock for Cabinet Doors



When the doors of the Power Module/LV Control Cabinet or Isolation Transformer Cabinet are not closed, when the drive is being maintained or when the control power switch is not closed, the drive will not send a signal allowing the input circuit breaker to close; this is wired as a permissive contact in the input circuit breaker's closing circuit so that the input circuit breaker cannot close.

Wire Routing and Connection

The electrical safety interlock control signal wiring enters the drive through the same opening as the control power wiring in the bottom of the LV Control Cabinet (Figure 58).

The wiring terminates to the DTB1 terminal block strip on the right side of the LV Control cabinet (Figure 59). See Figure 87 or Figure 88 for general information. Refer to Electrical Drawings for actual connection points.

Notes:

Drive Electrical Interconnection (For IEC)

Introduction

The drive is shipped in two sections, the Isolation Transformer cabinet and the Power Module/LV Control cabinet. An optional bypass cabinet may also be supplied. Chapter 2 describes mechanically joining these cabinets together. This chapter describes the activities required to electrically connect these drive cabinets' components together (information about connecting the Bypass cabinet to the drive is included in publication 6000-UM002_-EN-P, 6012DB Medium Voltage Bypass Cabinet User Manual).

Electrical Interconnection Summary

Power Cable Interconnection Overview

Figure 61 provides a three-line drawing overview of the power cable interconnections between the power modules (PC XX) in the Power Module/LV Control cabinet and the secondary windings of the isolation transformer in the Isolation Transformer cabinet. The number of power modules is dependent solely on output (motor) voltage:

- 9 power modules for 3/3.3 kV
- 18 power modules for 6/6.6 kV
- 27 power modules for 10 kV

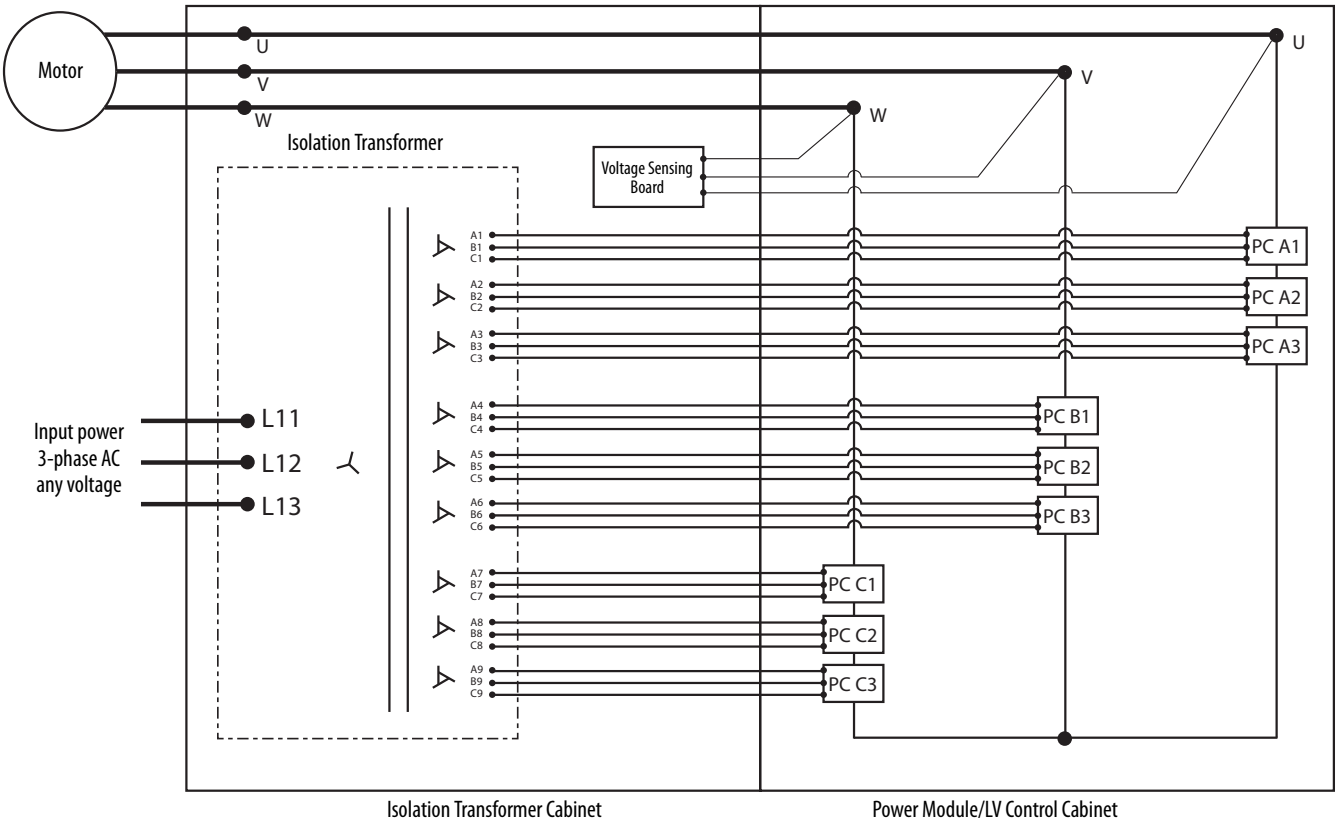
It also shows the connection point from the U, V, and W motor output phases from the power module array to the voltage sensing board cables and the motor cables.

The isolation transformer secondary windings as shown do reflect the actual orientation on the isolation transformer.

The Power Module/LV Cabinet orientation is optimized for drawing clarity. To better understand the physical orientation, the components and connections shown in the Power Module/LV Control Cabinet would be rotated 90° counter clockwise. The U phase is the top horizontal row, the V phase is the middle horizontal row, and the W phase is the bottom horizontal row.

Refer to the Electrical Drawing for actual wire number designations.

Figure 61 - Power Cabling Overview (3.3 kV Fixed-mounted Power Module Configuration)

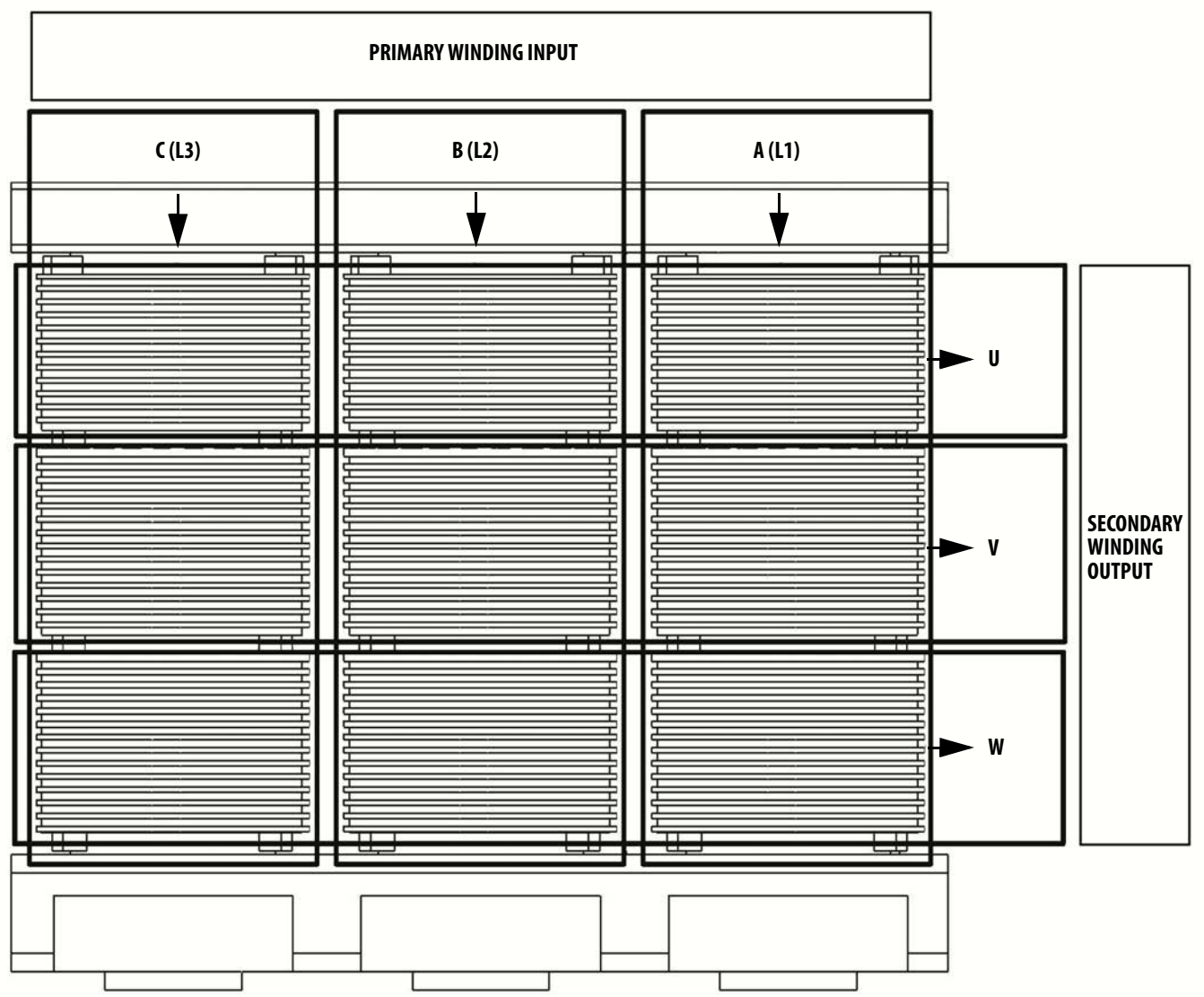


Connect Isolation Transformer Secondary Power Cables

Introduction

The isolation transformer's three-phase primary coils are oriented C, B, and A from left to right, as viewed from the front. The secondary windings are also divided into three principal sections from top to bottom. The upper third are to feed the power modules in the U output phase. The middle third are to feed the power modules in the V output phase. The bottom third are to feed the power modules in the W output phase (Figure 62).

Figure 62 - Isolation Transformer Primary and Secondary Winding Orientation



The secondary windings are brought out to corresponding vertical isolated stand-offs on the body of the transformer (orientated C, B, and A from left to right as viewed from the front). See Figure 63.

Each secondary winding set will have a designated C, B, and A terminal connection. For example, (from top to bottom and left to right) the terminals from the first winding set are C1, B1, and A1, the terminals from the next winding set are C2, B2, and A2, and so on.

As shown in Figure 61, the first winding set (C1, B1, and A1) will connect to the three-phase input power connection of the first power module in the U motor phase array (PCA1), the second winding set will connect to the second power module in the U motor phase array (PCA2), and the third winding set will connect to the third power module in the U motor phase array (PCA3). The next three winding sets connect to the power modules in the V motor phase array. The remaining three winding sets connect to the power modules in the W motor phase array.

Figure 61 shows 3/3.3 kV configuration. The 6/6.6 kV and 10 kV configuration have more power modules and therefore have more corresponding isolation transformer secondary windings. The concept is the same—the top third of the winding sets feeds the power modules in the U phase, the middle third feeds the power modules in the V phase, and the bottom third feeds the power modules in the W phase.

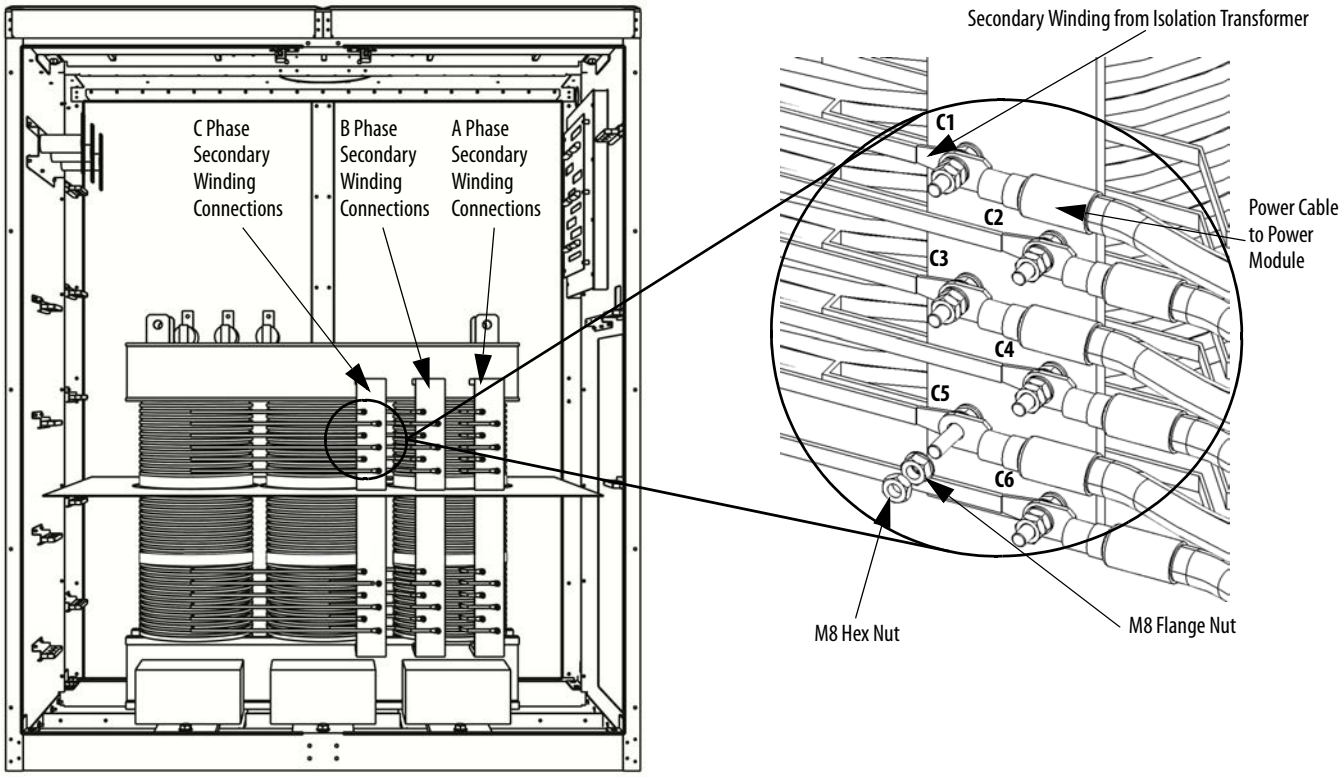
Each three-phase secondary winding set of the isolation transformer has three individual single phase power cables connecting its output to the three-phase power input of its corresponding power module.

For drives with fixed-mounted power modules, the U and W phase interconnections to the isolation transformer secondary windings are on the front of the isolation transformer and the connections to the V phase are on the rear of the isolation transformer. The power cable connections to the power modules are made at the factory. Therefore, the field power cable connections need to be made at the isolation transformer secondary winding termination points (Figure 63).

For drives with drawout power modules, all of the interconnections between the isolation transformer secondary windings and the power modules are made in the rear of the isolation transformer and the connection to the power modules are also in the rear. The power cable connections to the isolation transformer secondary winding termination point are made at the factory. Therefore, the field power cable connections must be made at the power module input points (Figure 64).

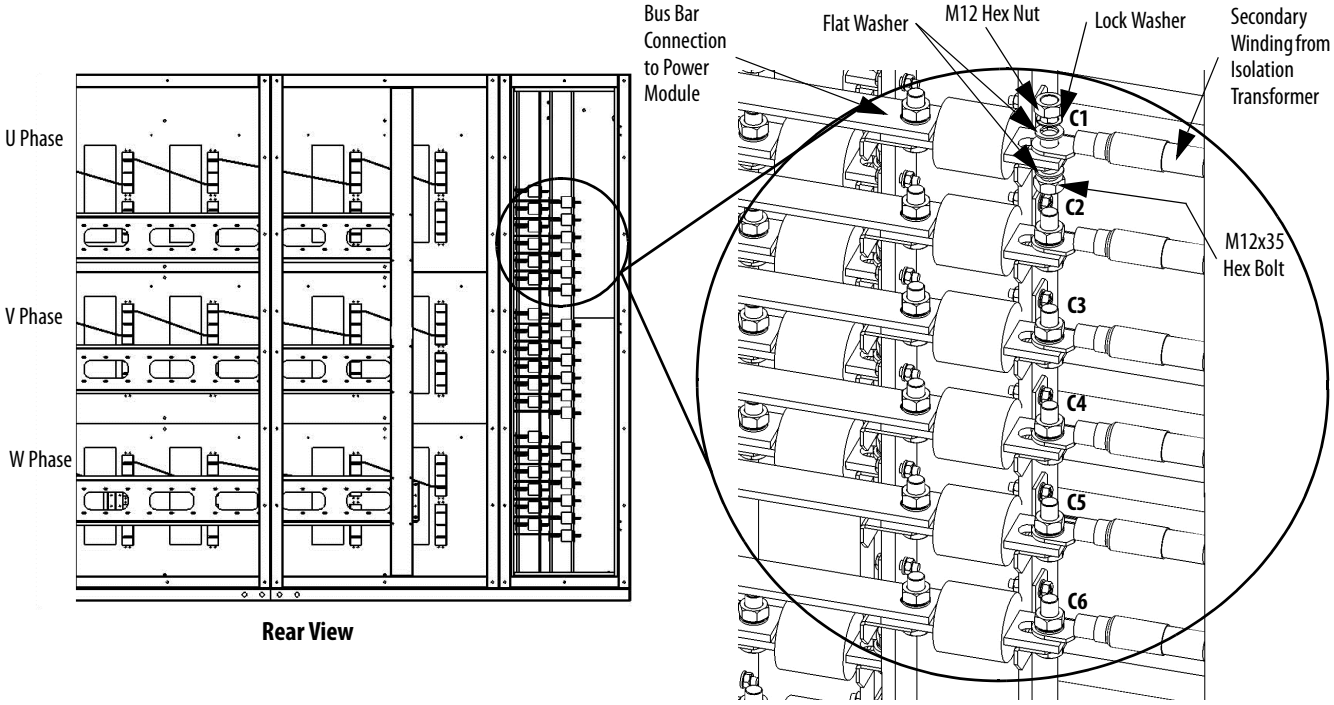
Cable Routing and Connection

Figure 63 - 6/6.6 kV (Fixed-mounted Power Module Configuration)



Front View

Figure 64 - 6/6.6 kV (Drawout Power Module Configuration)



Rear View

Connect Motor and Voltage Sensing Board Cables

Introduction

The Voltage Sensing Board cables and the motor cables both connect to the same output point of each motor phase array (Figure 61). However, because the fixed-mount and drawout power module mechanical designs are different, the physical connection point differs between these two configurations.

The voltage sensing board cables and motor cables are always bundled in the isolation transformer cabinet for shipment.

Figure 65 - 6/6.6 kV (Fixed-mounted Power Module Configuration)

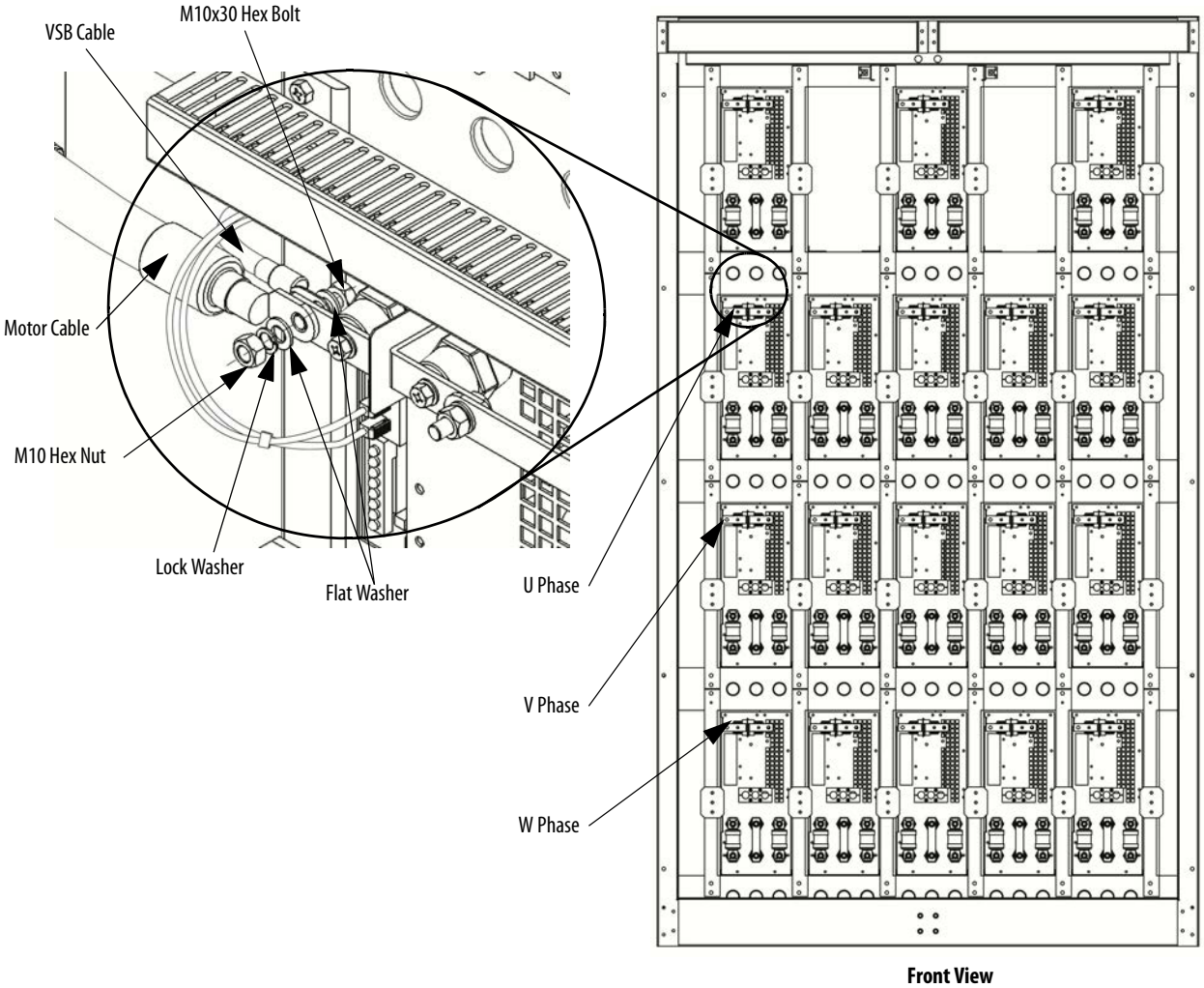
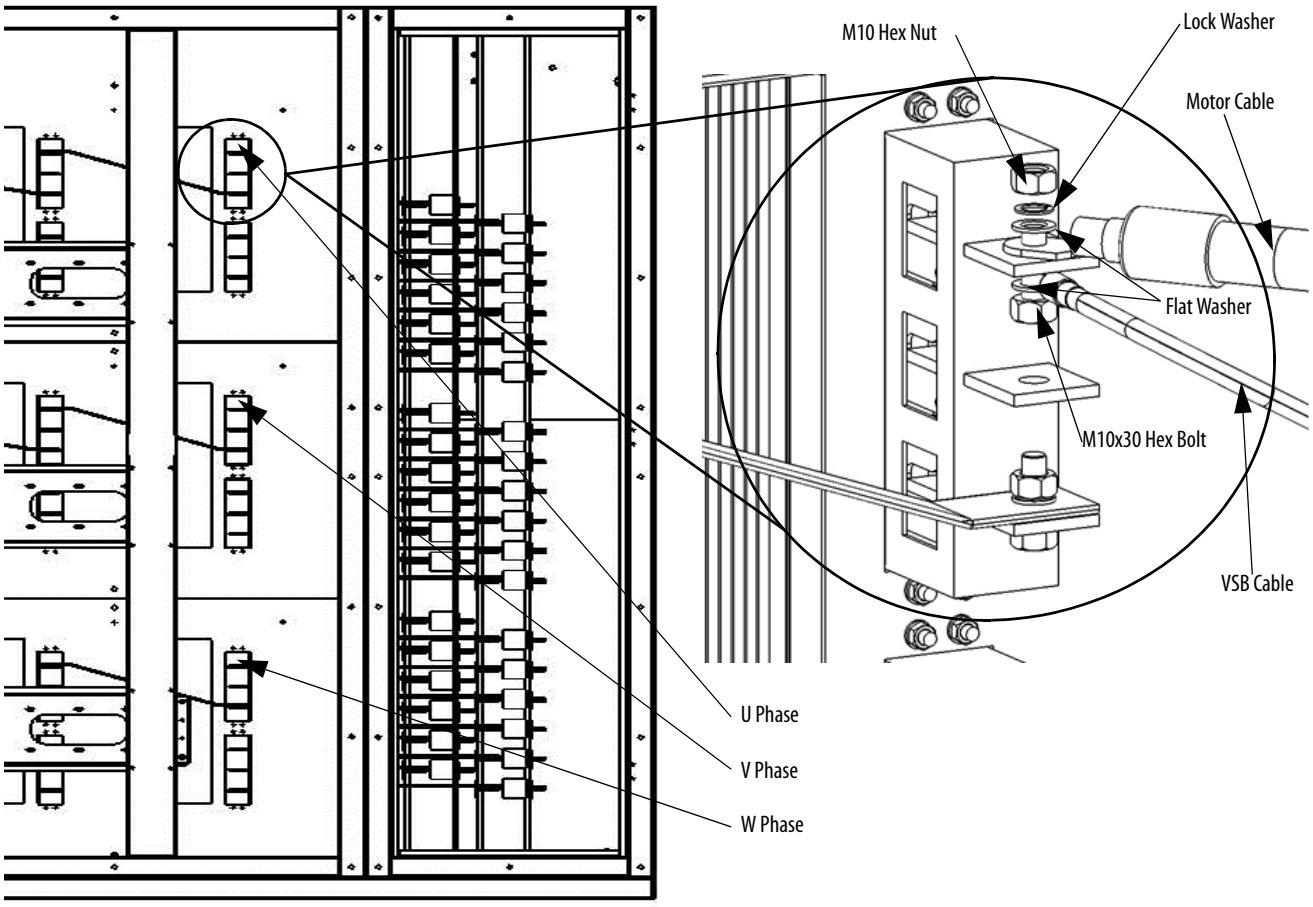


Figure 66 - 6/6.6 kV (Drawout Power Module Configuration)



Rear View

Connect LV Control and Fan Wiring Bundles

Introduction

There are control wiring bundles that must be reconnected after the drive cabinets are connected together. These control wiring bundles are connected for the factory test and then disconnected and bundled at the shipping splits before shipment.

Each of the four drive configurations are shown:

- Fixed-mounted Power Module (without Bypass)
- Fixed-mounted Power Module (with Bypass)
- Drawout Power Module (without Bypass)
- Drawout Power Module (with Bypass)

Each configuration shows the "as shipped" state. This shows where the wire bundles are coiled up, where they originate, where they terminate, and whether they are ran in the front or rear wireway. The "connected" state is also shown for each configuration. For exact wire numbers and terminal block designations, refer to the Electrical Drawings.

X1 to X5 refer to terminal block strips in the various cabinets.

Fixed-mounted Power Module Configuration (without Bypass)

Figure 67 - Interconnection Configuration (As shipped)

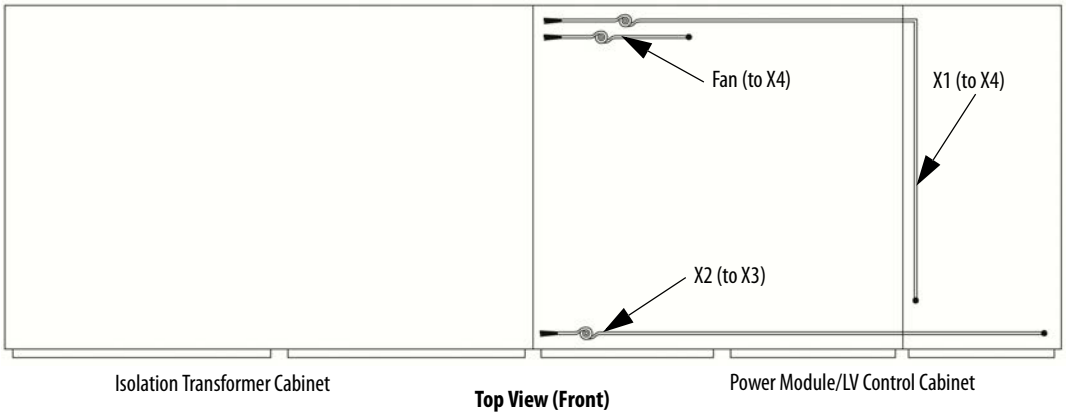
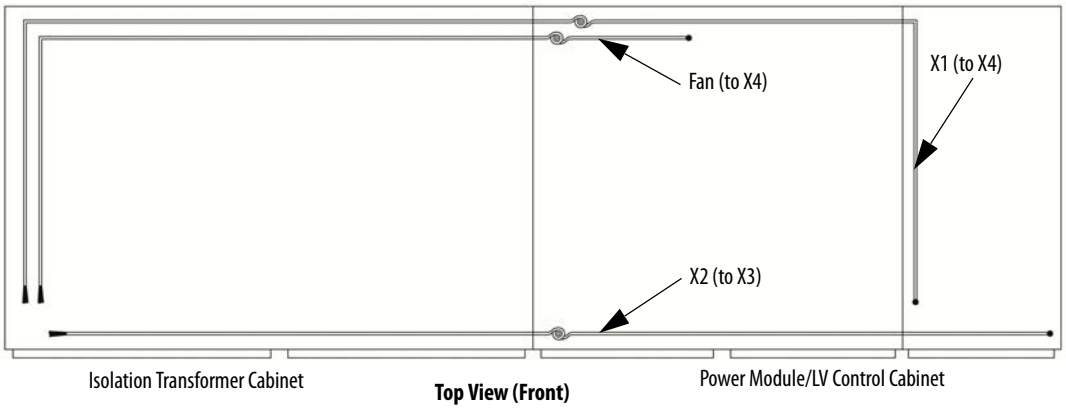
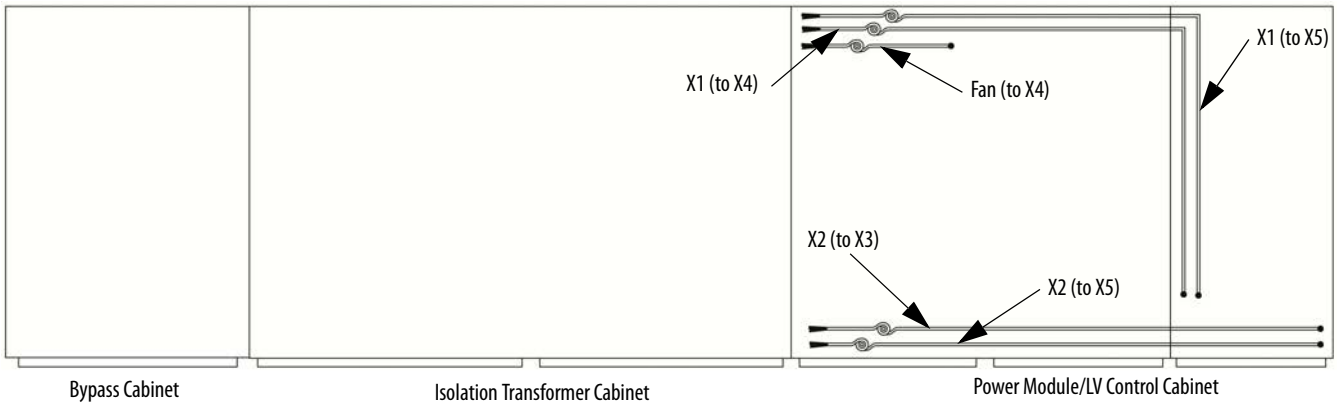


Figure 68 - Interconnection Configuration (Connected)



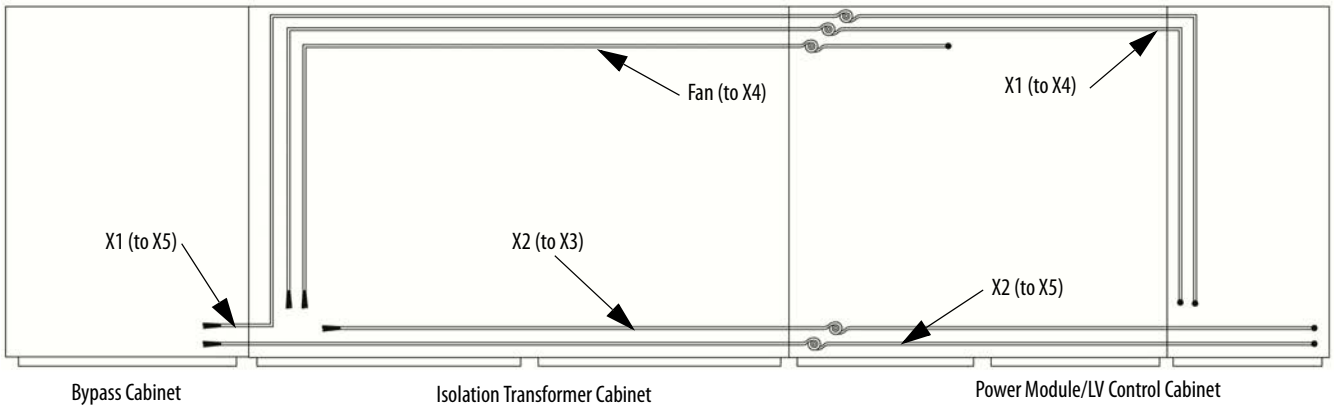
Fixed-mounted Power Module Configuration (with Bypass)

Figure 69 - Interconnection Configuration (As shipped)



Top View (Front)

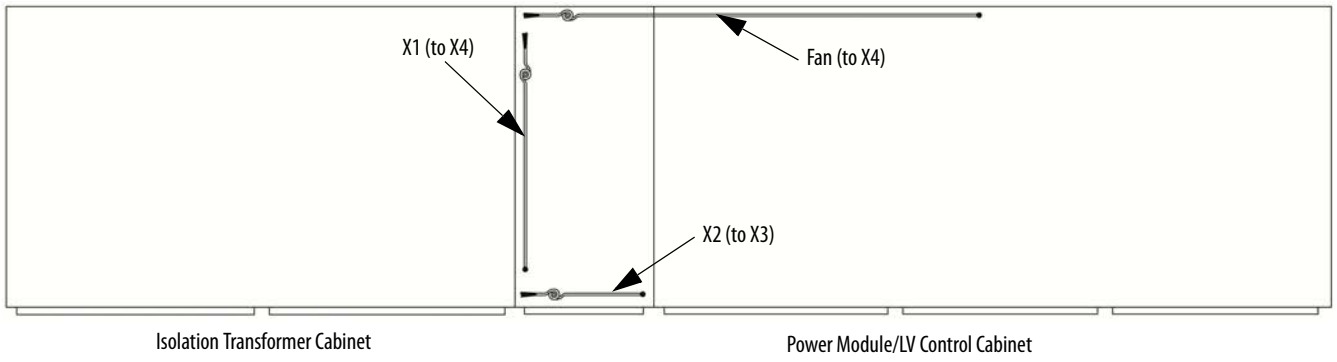
Figure 70 - Interconnection Configuration (Connected)



Top View (Front)

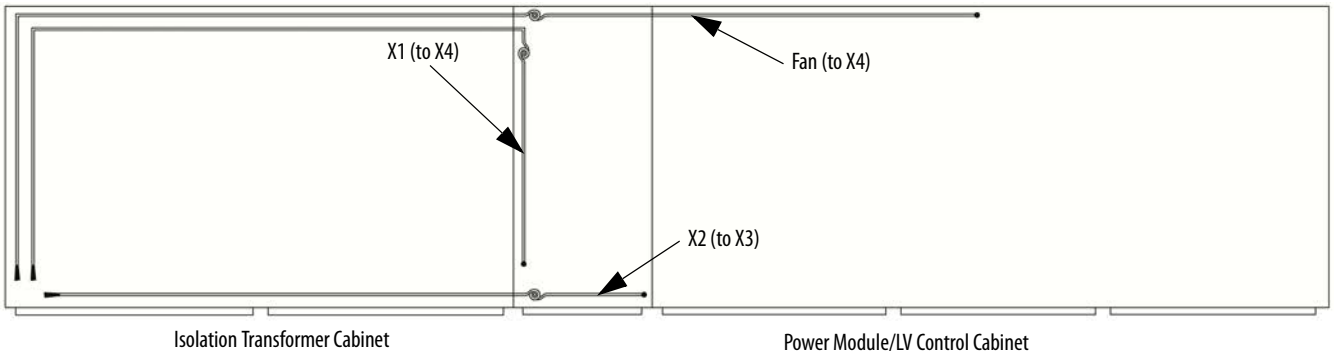
Drawout Power Module Configuration (without Bypass)

Figure 71 - Interconnection Configuration (As shipped)



Top View (Front)

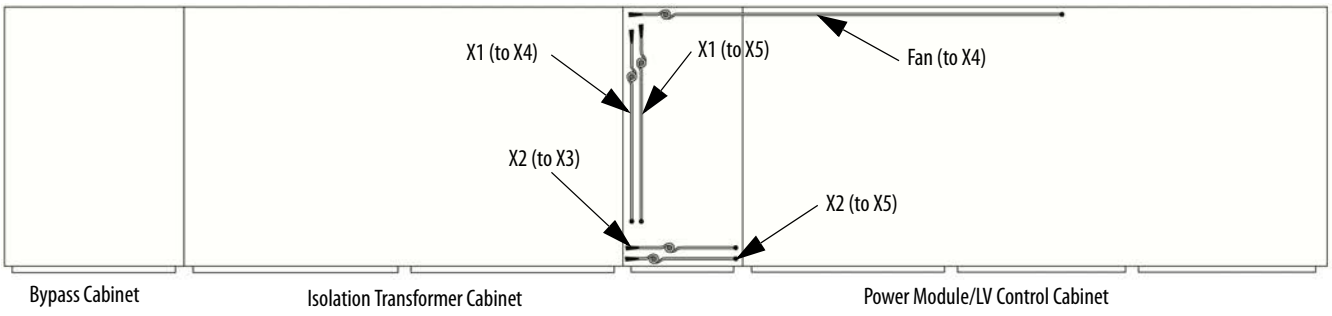
Figure 72 - Interconnection Configuration (Connected)



Top View (Front)

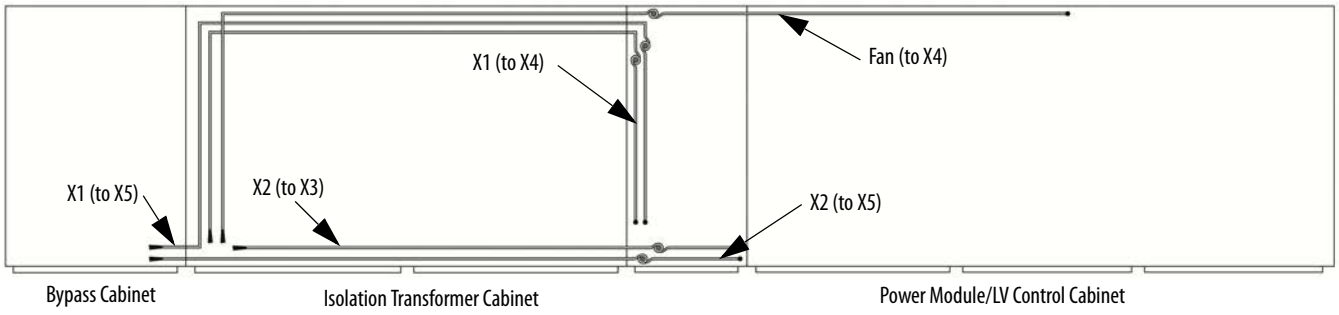
Drawout Power Module Configuration (with Bypass)

Figure 73 - Interconnection Configuration (As shipped)



Top View (Front)

Figure 74 - Interconnection Configuration (Connected)



Top View (Front)

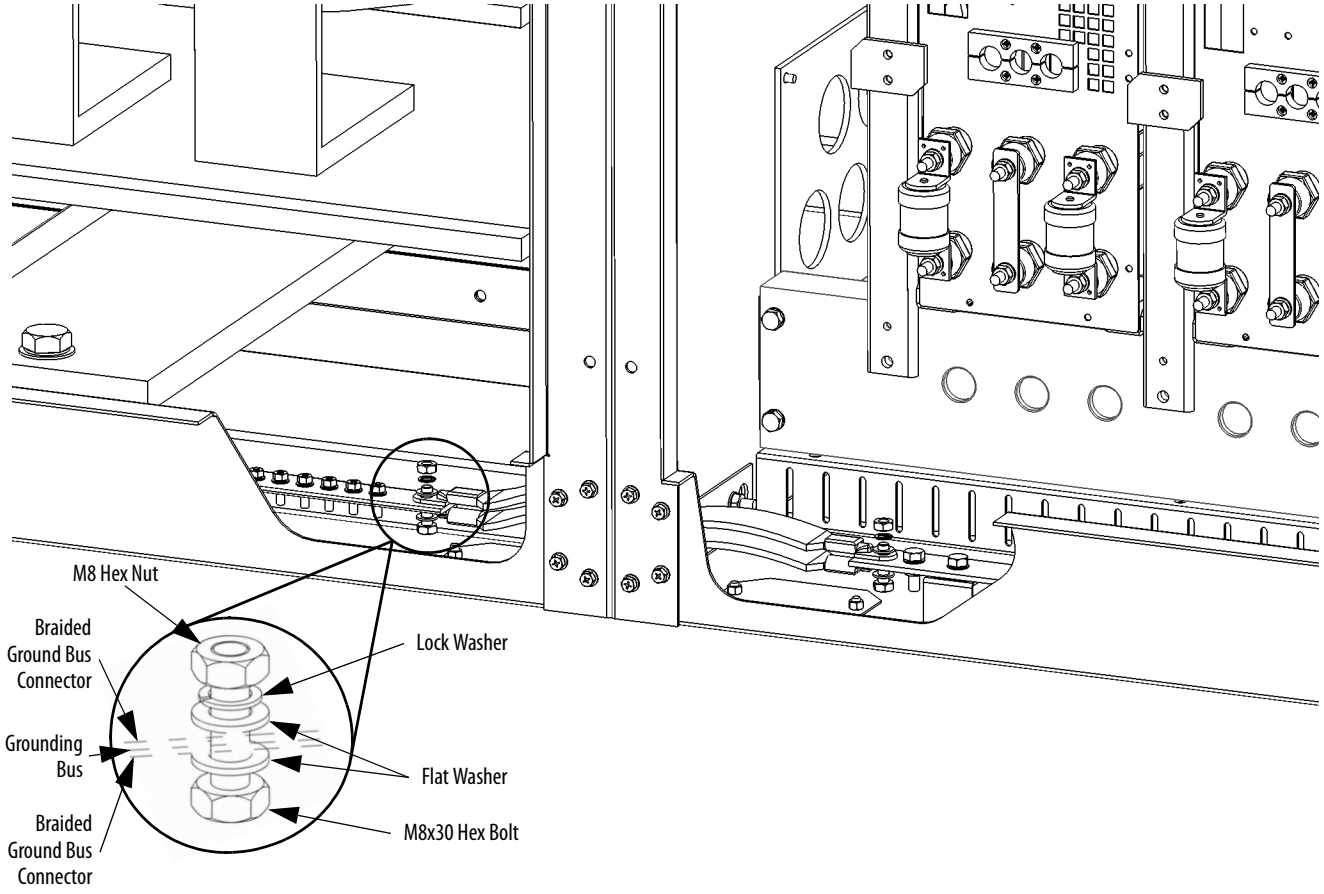
Connect Ground Bus

Introduction

A solid ground bus is located at the bottom front of each cabinet. When a shipping split is required, two braided ground bus connectors are supplied. One is attached above the solid ground bus and one below (Figure 75).

Ground bus connection openings are provided in the cabinet sidesheets for this connection. See Table 9 on page 45 and Table 10 on page 46.

Figure 75 - Interconnection Ground



Complete the Installation

1. Inspect the interior of all cabinets carefully for hardware or tools that may have been misplaced.
2. Check and verify that no hardware or foreign material has fallen in the secondary windings in the Isolation Transformer cabinet.
3. Check that all mechanical work has been completed properly. All barriers and guards that may have been removed must be reinstalled.
4. Check that all electrical connections have been made and torqued as specified.
5. Verify the safety circuit is working properly (see page 79).
6. Reinstall all of the cabinet back plates.

Notes:

Drive Electrical Interconnection (For UL)

Introduction

The drive is shipped in two sections, the Isolation Transformer cabinet and the Power Module/LV Control cabinet. An optional bypass cabinet may also be supplied. Chapter 2 describes mechanically joining these cabinets together. This chapter describes the activities required to electrically connect these drive cabinets' components together (information about connecting the Bypass cabinet to the drive is included in publication 6000-UM002_-EN-P, 6012DB Medium Voltage Bypass Cabinet User Manual).

Electrical Interconnection Summary

Power Cable Interconnection Overview

Figure 76 provides a three-line drawing overview of the power cable interconnections between the power modules (PC XX) in the Power Module/LV Control cabinet and the secondary windings of the isolation transformer in the Isolation Transformer cabinet. The number of power modules is dependent solely on output (motor) voltage:

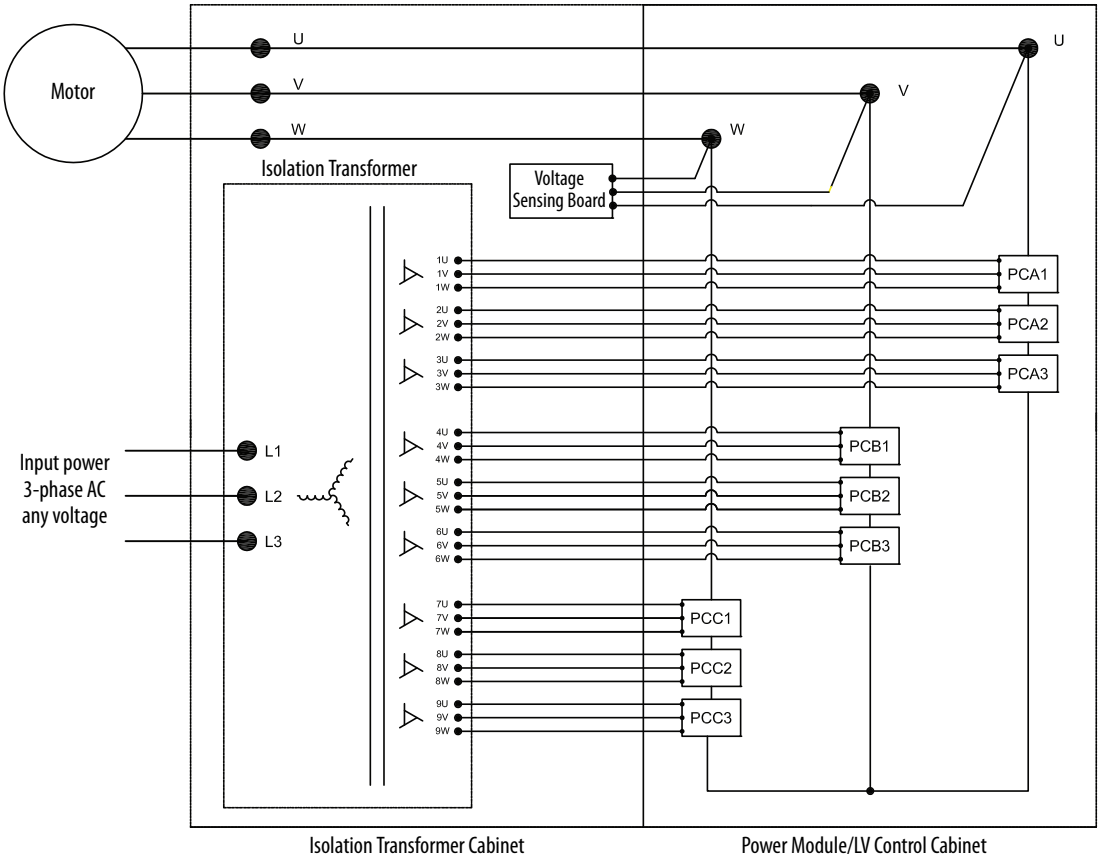
- 9 power modules for 2.3/2.4 kV
- 12 power modules for 4.0/4.16 kV
- 18 power modules for 6.0/6.3/6.6 kV

It also shows the connection point from the U, V, and W motor output phases from the power module array to the voltage sensing board cables and the motor cables.

The isolation transformer secondary windings as shown do reflect the actual orientation on the isolation transformer.

The Power Module/LV Cabinet orientation is optimized for drawing clarity. To better understand the physical orientation, the components and connections shown in the Power Module/LV Control Cabinet would be rotated 90° counter clockwise. The U phase is the top horizontal row, the V phase is the middle horizontal row, and the W phase is the bottom horizontal row.
Refer to the Electrical Drawing for actual wire number designations.

Figure 76 - Power Cabling Overview (2.3/2.4 kV Fixed-mounted Power Module Configuration)

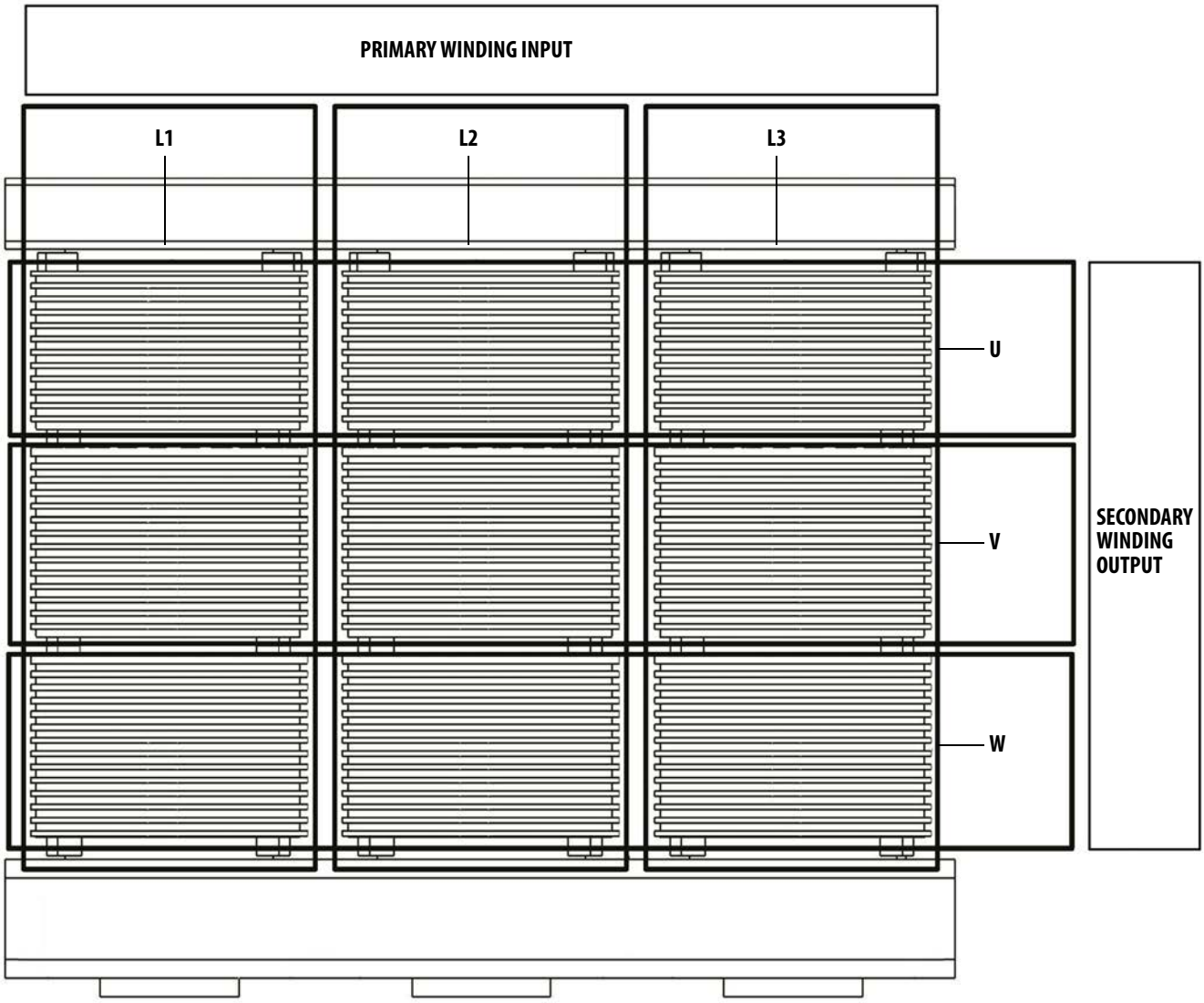


Connect Isolation Transformer Secondary Power Cables

Introduction

The isolation transformer's three-phase primary coils are oriented L1, L2, and L3 from left to right, as viewed from the front. The secondary windings are also divided into three principal sections from top to bottom. The upper third are to feed the power modules in the U output phase. The middle third are to feed the power modules in the V output phase. The bottom third are to feed the power modules in the W output phase (Figure 77).

Figure 77 - Isolation Transformer Primary and Secondary Winding Orientation



The secondary windings are brought out to corresponding vertical isolated stand-offs on the body of the transformer (orientated L1, L2, and L3 from left to right as viewed from the front). See Figure 78.

Each secondary winding set will have a designated W, V, and U terminal connection. For example, (from top to bottom and left to right) the terminals from the first winding set are 1U, 1V, and 1W, the terminals from the next winding set are 2U, 2V, and 2W, and so on.

As shown in Figure 76, the first winding set (1U, 1V, and 1W) will connect to the three-phase input power connection of the first power module in the U motor phase array (PCA1), the second winding set will connect to the second power module in the U motor phase array (PCA2), and the third winding set will connect to the third power module in the U motor phase array (PCA3). The next three winding sets connect to the power modules in the V motor phase array. The remaining three winding sets connect to the power modules in the W motor phase array.

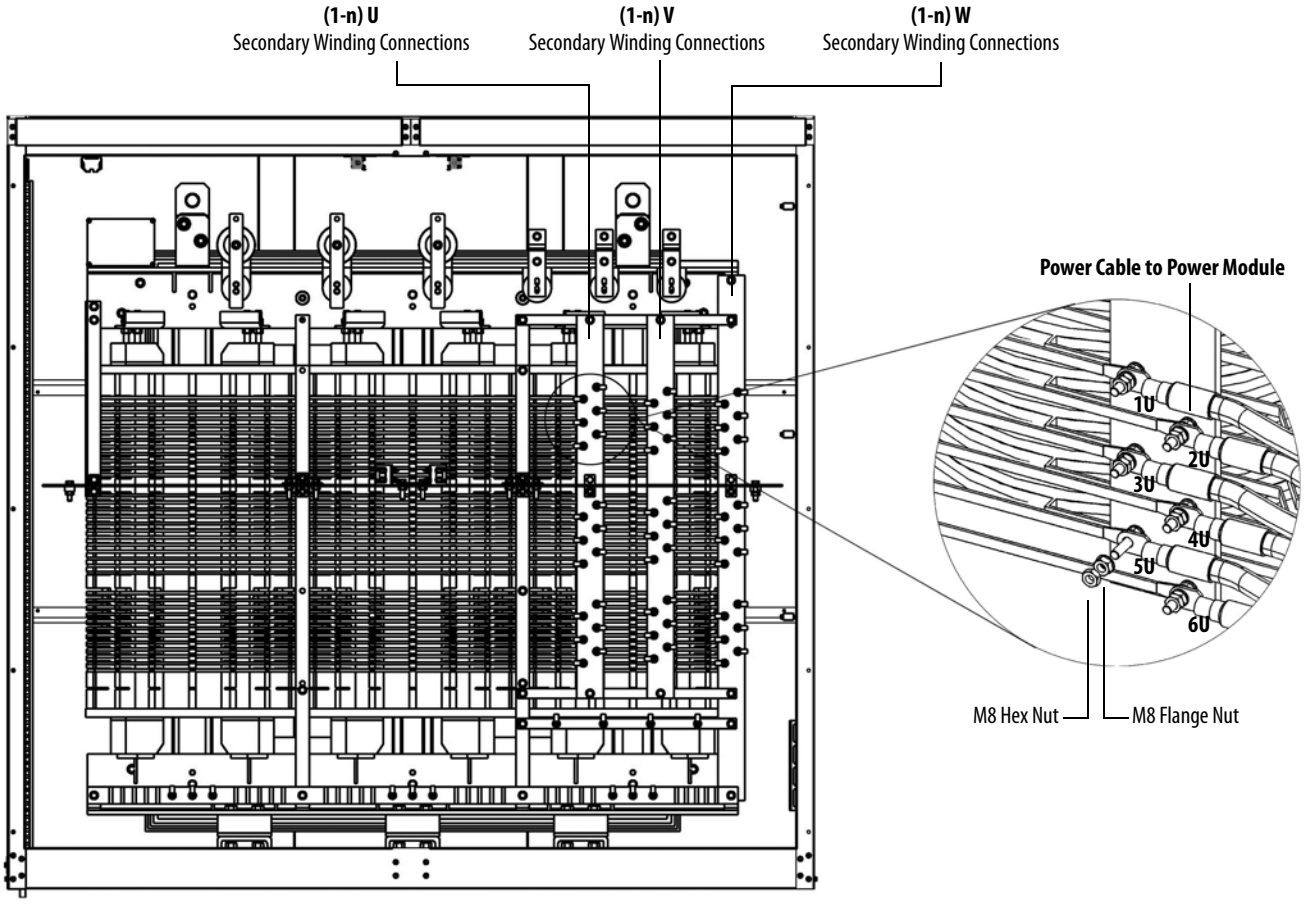
Figure 76 shows 2.3/2.4 kV, 4.0/4.16 kV, 6.0 kV, 6.3 kV, and 6.6 kV configuration. Larger configurations have more power modules and therefore have more corresponding isolation transformer secondary windings. The concept is the same—the top third of the winding sets feeds the power modules in the U phase, the middle third feeds the power modules in the V phase, and the bottom third feeds the power modules in the W phase.

Each three-phase secondary winding set of the isolation transformer has three individual single phase power cables connecting its output to the three-phase power input of its corresponding power module.

For drives with fixed-mounted power modules, the U, V, and W phase interconnections to the isolation transformer secondary windings are on the front of the isolation transformer. The power cable connections to the power modules are made at the factory. Therefore, the field power cable connections need to be made at the isolation transformer secondary winding termination points (Figure 78).

Cable Routing and Connection

Figure 78 - 6.0/6.3/6.6 kV (Fixed-mounted Power Module Configuration)



Front View

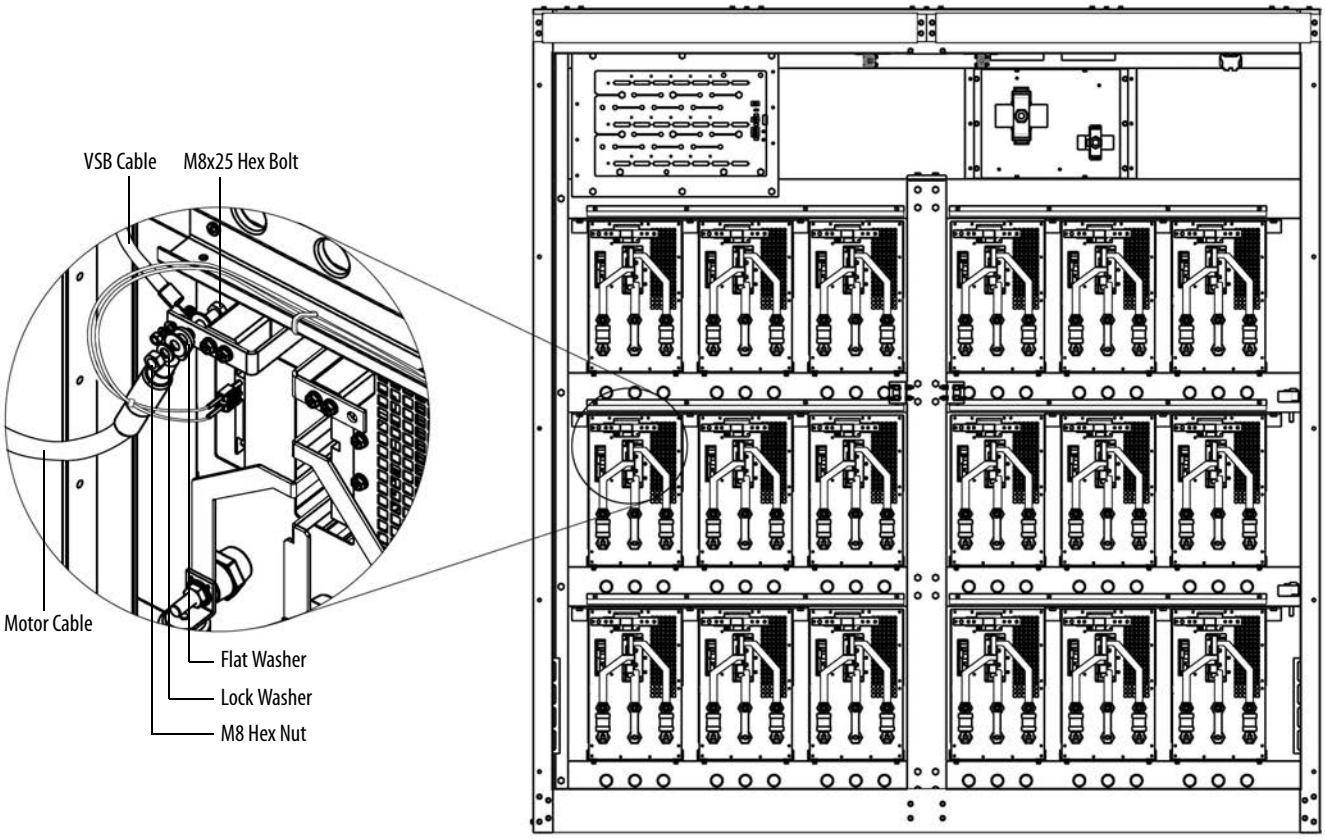
Connect Motor and Voltage Sensing Board Cables

Introduction

The Voltage Sensing Board cables and the motor cables both connect to the same output point of each motor phase array (Figure 76).

The voltage sensing board cables and motor cables are always bundled in the isolation transformer cabinet for shipment.

Figure 79 - 6.0/6.3/6.6 kV (Fixed-mounted Power Module Configuration)



Connect LV Control and Fan Wiring Bundles

Introduction

There are control wiring bundles that must be reconnected after the drive cabinets are connected together. These control wiring bundles are connected for the factory test and then disconnected and bundled at the shipping splits before shipment.

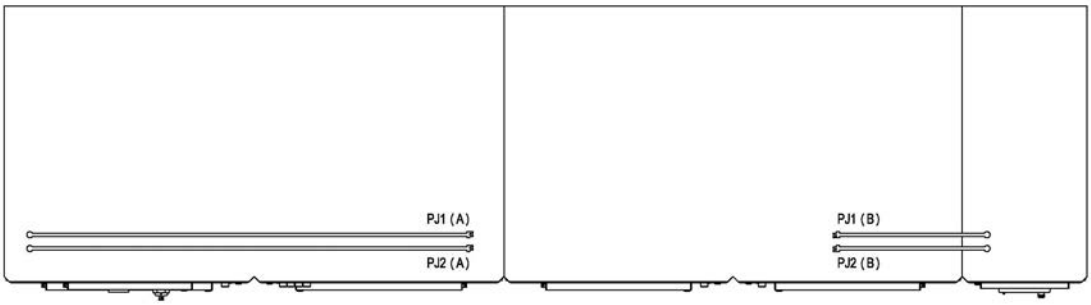
The configuration “Fixed-mounted Power Module (without Bypass)” is shown below.

The configuration is shown in the “as shipped” state. This shows where the wire bundles are coiled up, where they originate, where they terminate, and whether they are ran in the front or rear wireway. The “connected” state is also shown for each configuration. For exact wire numbers and terminal block designations, refer to the Electrical Drawings.

DTB1 to DTB4 refer to terminal block strips in the various cabinets.

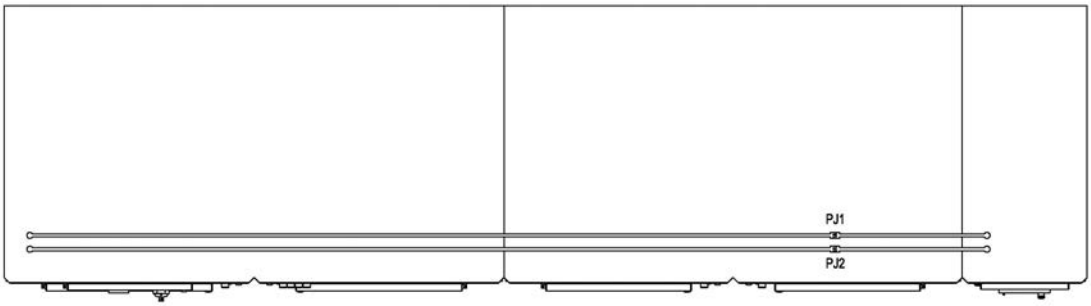
Fixed-mounted Power Module Configuration (without Bypass)

Figure 80 - Interconnection Configuration (As shipped)



Top View (Front)

Figure 81 - Interconnection Configuration (Connected)



Top View (Front)

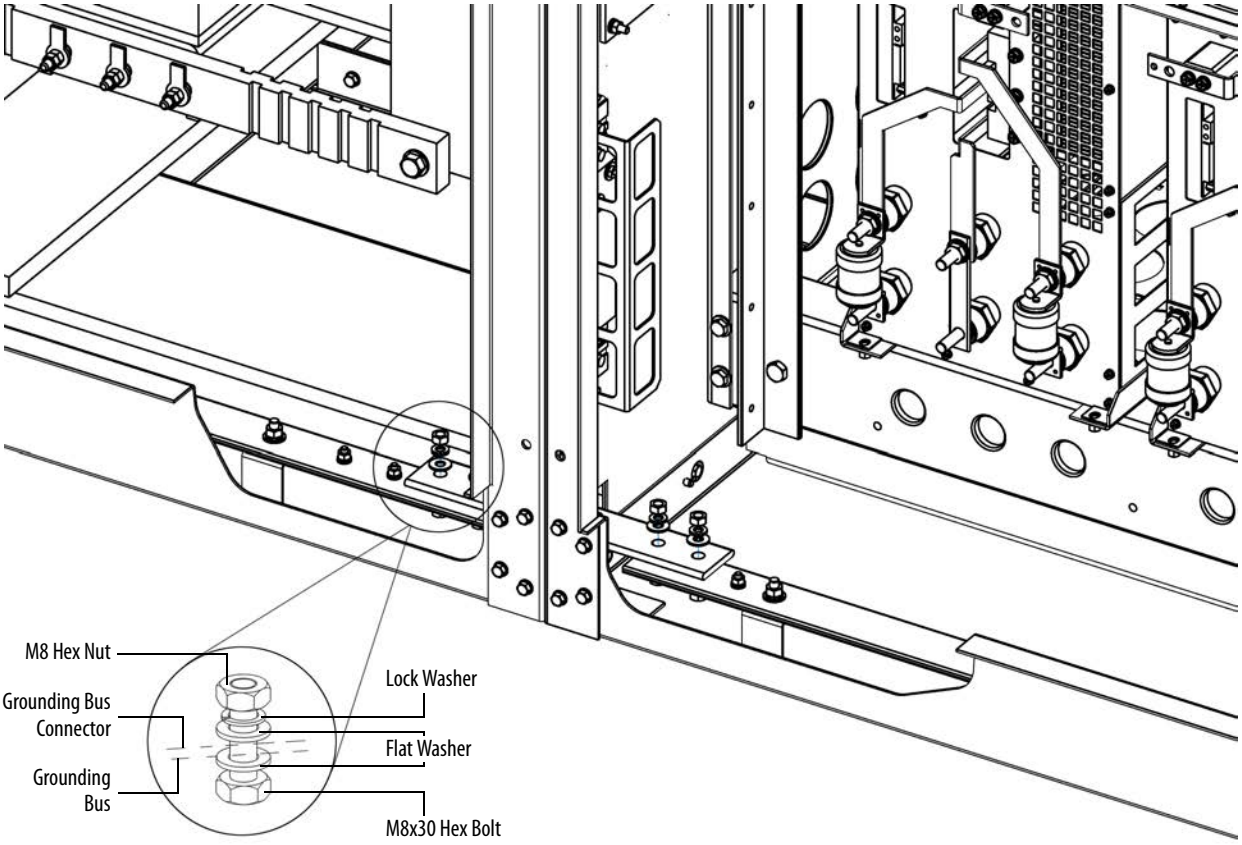
Connect Ground Bus

Introduction

A solid ground bus is located at the bottom front of each cabinet. When a shipping split is required, two braided ground bus connectors are supplied. One is attached above the solid ground bus and one below (Figure 82).

Ground bus connection openings are provided in the cabinet sidesheets for this connection. See Table 13 on page 60.

Figure 82 - Interconnection Ground



Complete the Installation

1. Inspect the interior of all cabinets carefully for hardware or tools that may have been misplaced.
2. Check and verify that no hardware or foreign material has fallen in the secondary windings in the Isolation Transformer cabinet.
3. Check that all mechanical work has been completed properly. All barriers and guards that may have been removed must be reinstalled.
4. Check that all electrical connections have been made and torqued as specified.
5. Verify the safety circuit is working properly (see page 92).
6. Reinstall all of the cabinet back plates.

Pre-Commissioning

Pre-Commissioning Responsibilities

Rockwell Automation manages the start-up service for each installed drive at the customer's site, but there are a number of tasks the customer or its representatives must complete before scheduling Rockwell Automation personnel for drive commissioning.

Review this information prior to commissioning the drive as a reference for drive line-up commissioning. Record the information in the data sheets provided; these are useful during future maintenance and troubleshooting exercises.

ATTENTION: Perform the pre-commissioning tasks in the order listed in this chapter. Failure to do so may result in equipment failure or personal injury.

IMPORTANT Rockwell Automation requests a minimum of four weeks' notice to schedule each start-up.

Inspection and Verification

Before the drive commissioning occurs, Rockwell Automation recommends that the customer arranges a pre-installation meeting to review:

a. the start-up plan
b. the start-up schedule
c. the drive(s) installation requirements
d. the pre-commissioning checklist

Customer personnel must be on-site to participate in the system start-up procedures.

See Safety and Codes on page 81.

ATTENTION: The CMOS devices used on the control circuit boards are susceptible to damage or destruction by static charges. Personnel working near static sensitive devices must be appropriately grounded.

Pre-Commissioning Checklist

Once all points of the checklist are complete, initial each check box and provide the date. Photocopy the checklist and fax the copy to the Rockwell Automation Start-up Manager, along with the planned start-up date. Upon receiving this checklist, the Project Manager will contact the site to finalize arrangements for a start-up engineer to travel to the site at your convenience.

Please print the following information:

Name:	Date:
Company:	
Phone:	Pages:
Fax:	

Drive Serial Number:	
Rockwell Automation Service Engineer Requested (YES/NO):	
Scheduled Commissioning Date:	

Table 20 - Receiving and Unpacking:

Initials	Date	Check	
			The drives have been checked for shipping damage upon receiving.
			After unpacking, the item(s) received are verified against the bill of materials.
			Any claims for breakage or damage, whether concealed or obvious, are made to the carrier by the customer as soon as possible after receipt of shipment.
			All packing material, wedges, or braces are removed from the drive.

Table 21 - Installation and Mounting:

Initials	Date	Check	
			The drive is securely fastened in an upright position, on a level surface.
			The Isolation Transformer Cabinet, Power Module Cabinet, and Bypass Cabinet (if applicable) are correctly installed.
			Lifting Angles have been removed.
			Bolts are inserted into original location on top of drive (prevent leakage of cooling air).
			All contactors and relays have been operated manually to verify free movement.
			The back plates to the cabinets have been reinstalled.

Table 22 - Safety:

Initials	Date	Check	
			The grounding of the drive should be in accordance with national and local electrical codes.

Table 23 - Control Wiring:

Initials	Date	Check	
			All low voltage wiring entering the drive is labeled, appropriate wiring diagrams are available, and all customer interconnections are complete.
			All AC and DC circuits are run in separate conduits.
			All wire sizes used are selected by observing all applicable safety and national and local electrical codes.
			Remote I/O is correctly installed and configured (if applicable).
			All 3-phase control wiring is within specified levels and has been verified for proper rotation, UVW.
			All single-phase control wiring is within specified levels and has grounded neutrals.
			Control lines must be shielded and grounded. Control and Power lines must run in separate conduits.
			The electrical safety interlock wiring to input circuit breaker is correctly installed.

Table 24 - Power Wiring:

Initials	Date	Check	
			The power cable connections to the drive, motor and isolation transformer adhere to national and local electrical codes.
			The cable terminations, if stress cones are used, adhere to the appropriate standards.
			Appropriate cable insulation levels are adhered to, as per Rockwell Automation specifications.
			All shields for shielded cables must be grounded at the source end only.
			If shielded cables are spliced, the shield must remain continuous and insulated from ground.
			All wire sizes used are selected by observing all applicable safety and national and local electrical codes.
			All power connections are torqued as per Rockwell Automation specifications. Refer to Torque Requirements on page 119.
			All customer power cabling has been meggered or hi-pot tested before connecting to drive system.
			Power wiring phase rotation has been verified per the specific electrical diagrams supplied by Rockwell Automation.

Table 25 - Interconnection Wiring

Initials	Date	Check	
			The power cable connection between the Isolation Transformer and Power Modules.
			The motor cable connection to the three output buses.
			The Voltage Sensing Board connections to the three output buses.
			All low voltage connections to the Isolation Transformer Low Voltage panel.

Table 26 - Drive Line-up Status

Initials	Date	Check	
			The medium voltage and low voltage power is available for startup activities.
			The motor is uncoupled from the driven load.
			The load is available for full load testing.

Torque Requirements

Torque Requirements

Proper tightening torque must be used for installation and wiring.

Table 27 - Torque Requirements for IEC

Thread Size	Torque	
	N•m	lb•ft
M4	1.4	1.0
M5	2.8	2.1
M6	4.6	3.4
M8	11	8.1
M10	22	16.2
M12	39	28.8
M14	62	45.7
M16	95	70.1
M20	184	135.7

Table 28 - Torque Requirements for UL

Thread Size	Torque	
	N•m	lb•ft
M4	3.0	2.2
M5	5.9	4.4
M6	10.5	7.7
M8	26.0	19.2
M10	51.0	37.6
M12	89.0	65.7
M14	141.0	104.1
M16	215.0	158.7
M20	420.0	310.0

Notes:

General Wire Categories

General Wire Categories

Conductors Category	Conductors Group	Machine With	Signal Examples	Recommended Cable	Conductors Group	Power Supplies mm (in.)	Control mm (in.)	To PLC
Power Supplies	1	AC power supply (TO 600V AC)	220V, 1Ø	Per IEC / NEC, Local codes and application requirements	Tray	228.6 (9.00)	152.4 (6.00)	All signal wiring must be run in separate steel conduit. A wire tray is not suitable. The minimum spacing between conduits containing different wire groups is 76.2 mm (3 in.).
Control	2	220V AC or 220V DC Logic	Relay Logic PLC I/O	Per IEC / NEC, Local codes and application requirements	Tray	228.6 (9.00)	152.4 (6.00)	
	3	24V AC or 24V DC logic	PLC I/O	Per IEC / NEC, Local codes and application requirements	Tray	228.6 (9.00)	152.4 (6.00)	
To PLC	4	Analog Signal DC supply	5...24V DC Supplies	Belden 8760(1) Belden 8770(2) Belden 9460(3)	All signal wiring must be run in separate steel conduit. A wire tray is not suitable. The minimum spacing between conduits containing different wire groups is 76.2 mm (3 in.).			
	5	Digital circuit (high speed)	Pulse train input tachometer PLC communication	Belden 8760(1) Belden 9460(3) Belden 9463(4)				

(1) 18 AWG, twisted pair, shielded

(2) 18 AWG, 3 conductor, shielded

(3) 18 AWG, twisted pair, shielded

(4) 24 AWG, twisted pair, shielded

Notes:

PowerFlex 6000 Dimensions and Weights (For IEC)

Overview

Dimensions (mm)	
W1	Width of Cabinet 1 (Isolation Transformer section)
W2	Width of Cabinet 2 (Power Module section and Low Voltage Control section)
W	Total width
D1	Depth of cabinet base (footprint)
D2	Depth of doors beyond cabinet base
D	Total depth (including door depth)
H1	Height of Cabinet
H2	Height of Fan
H	Total height (including fan)

Weight (kg)	
M1	Weight of Cabinet 1 (Isolation Transformer section)
M2	Weight of Cabinet 2 (Power Module section and Low Voltage Control section)
M	Total weight

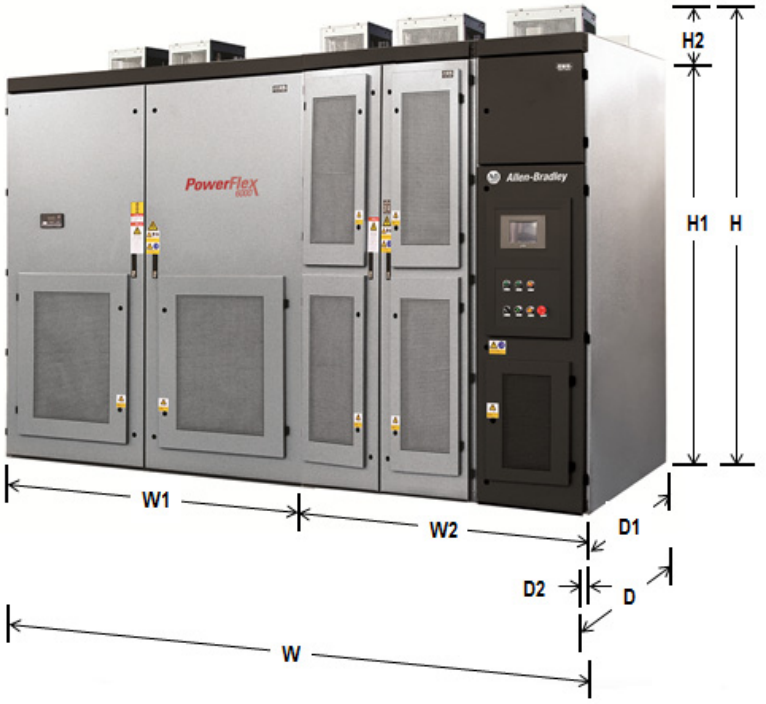


Table 29 - 3000V AC Input/output (18 Pulse Configuration - 9 Power Cells)

A A A Output Amps		Typical Motor Power Rating		Transformer Rating	Dimensions (mm)									Weight (kg)			Cooling Fans							
					Width			Depth			Height						W1				W2			
Cont.	1 Min.	kW	Hp	kVA	W1	W2	W	D1	D2	D	H1	H2	H	M1	M2	M	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
																		m^3/s	L/s	CFM		m^3/s	L/s	CFM
80	96	320	420	400	2000	1780	3780	1300	62	1362	2400	330	2730	1850	1080	2930	1	1.0	917	1942	1	1.9	1884	3883
90	108	360	480	450	2000	1780	3780	1300	62	1362	2400	330	2730	1900	1080	2980	1	1.0	917	1942	1	1.9	1884	3883
100	120	400	530	500	2000	1780	3780	1300	62	1362	2400	330	2730	1950	1080	3030	1	1.0	917	1942	1	1.9	1884	3883
112	134	440	580	560	2000	1780	3780	1300	62	1362	2400	330	2730	2000	1080	3080	1	1.0	917	1942	1	1.9	1884	3883
125	150	500	670	630	2000	1780	3780	1300	62	1362	2400	330	2730	2050	1080	3130	1	1.0	917	1942	1	1.9	1884	3883
140	168	560	750	710	2000	1780	3780	1300	62	1362	2400	330	2730	2100	1080	3180	1	1.0	917	1942	1	1.9	1884	3883
150	180	600	800	750	2000	1780	3780	1300	62	1362	2400	330	2730	2150	1080	3230	1	1.0	917	1942	1	1.9	1884	3883
160	192	640	850	800	2000	1780	3780	1300	62	1362	2400	330	2730	2200	1170	3370	1	1.0	917	1942	1	1.9	1884	3883
180	216	720	960	900	2000	1780	3780	1300	62	1362	2400	330	2730	2250	1170	3420	1	1.0	917	1942	1	1.9	1884	3883
200	240	800	1070	1000	2000	1780	3780	1300	62	1362	2400	330	2730	2300	1170	3470	1	1.0	917	1942	1	1.9	1884	3883
225	270	920	1230	1150	2400	2000	4400	1300	62	1362	2400	330	2730	2350	1360	3710	1	1.9	1834	3883	1	2.8	2750	5824
250	300	1000	1340	1250	2400	2000	4400	1300	62	1362	2400	330	2730	2400	1360	3760	2	1.9	1834	3883	2	2.8	2750	5824
280	336	1120	1500	1400	2400	2000	4400	1300	62	1362	2400	330	2730	2450	1360	3810	2	1.9	1834	3883	2	2.8	2750	5824
300	360	1200	1600	1500	2400	2000	4400	1300	62	1362	2400	330	2730	2500	1360	3860	2	1.9	1834	3883	2	2.8	2750	5824
315	378	1280	1710	1600	2400	2000	4400	1300	62	1362	2400	330	2730	3700	1360	5060	2	1.9	1834	3883	2	2.8	2750	5824
350	420	1440	1930	1800	2400	2000	4400	1300	62	1362	2400	330	2730	3900	1360	5260	2	1.9	1834	3883	2	2.8	2750	5824
380	456	1600	2140	2000	2400	2000	4400	1300	62	1362	2400	330	2730	4000	1360	5360	2	1.9	1834	3883	2	2.8	2750	5824

Table 30 - 3300V AC Input/Output (18 Pulse Configuration - 9 Power Cells)

AAA Output Amps		Typical Motor Power Rating		Transformer Rating	Dimensions (mm)									Weight (kg)			Cooling Fans							
					Width			Depth			Height						W1				W2			
Cont.	1 Min.	kW	Hp	kVA	W1	W2	W	D1	D2	D	H1	H2	H	M1	M2	M	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
																		m^3/s	L/s	CFM		m^3/s	L/s	CFM
80	96	360	480	450	2000	1780	3780	1300	62	1362	2400	330	2730	1950	1080	3030	1	1.0	917	1942	1	1.9	1834	3883
90	108	400	530	500	2000	1780	3780	1300	62	1362	2400	330	2730	2050	1080	3130	1	1.0	917	1942	1	1.9	1834	3883
100	120	440	580	560	2000	1780	3780	1300	62	1362	2400	330	2730	2150	1080	3230	1	1.0	917	1942	1	1.9	1834	3883
112	134	500	670	630	2000	1780	3780	1300	62	1362	2400	330	2730	2200	1080	3280	1	1.0	917	1942	1	1.9	1834	3883
125	150	560	750	710	2000	1780	3780	1300	62	1362	2400	330	2730	2250	1080	3330	1	1.0	917	1942	1	1.9	1834	3883
140	168	640	850	800	2000	1780	3780	1300	62	1362	2400	330	2730	2400	1080	3480	1	1.0	917	1942	1	1.9	1834	3883
150	180	680	910	850	2000	1780	3780	1300	62	1362	2400	330	2730	2450	1080	3530	1	1.0	917	1942	1	1.9	1834	3883
160	192	720	960	900	2000	1780	3780	1300	62	1362	2400	330	2730	2600	1170	3770	1	1.0	917	1942	1	1.9	1834	3883
180	216	800	1070	1000	2000	1780	3780	1300	62	1362	2400	330	2730	2700	1170	3870	1	1.0	917	1942	1	1.9	1834	3883
200	240	890	1190	1120	2000	1780	3780	1300	62	1362	2400	330	2730	2800	1170	3970	1	1.0	917	1942	1	1.9	1834	3883
225	270	1010	1350	1265	2400	2000	4400	1300	62	1362	2400	330	2730	3250	1360	4610	2	1.9	1834	3883	2	2.8	2750	5824
250	300	1120	1500	1400	2400	2000	4400	1300	62	1362	2400	330	2730	3500	1360	4860	2	1.9	1834	3883	2	2.8	2750	5824
280	336	1260	1680	1575	2400	2000	4400	1300	62	1362	2400	330	2730	3700	1360	5060	2	1.9	1834	3883	2	2.8	2750	5824
300	360	1320	1760	1650	2400	2000	4400	1300	62	1362	2400	330	2730	3900	1360	5260	2	1.9	1834	3883	2	2.8	2750	5824
315	378	1400	1870	1750	2400	2000	4400	1300	62	1362	2400	330	2730	4000	1360	5360	2	1.9	1834	3883	2	2.8	2750	5824
350	420	1560	2090	1950	2400	2000	4400	1300	62	1362	2400	330	2730	4200	1360	5560	2	1.9	1834	3883	2	2.8	2750	5824
380	456	1720	2300	2150	2400	2000	4400	1300	62	1362	2400	330	2730	4500	1360	5860	2	1.9	1834	3883	2	2.8	2750	5824

Table 31 - 6000V AC Input/Output (36 Pulse Configuration - 18 Power Cells)

AAA Output Amps		Typical Motor Power Rating		Transformer Rating	Dimensions (mm)									Weight (kg)			Cooling Fans							
					Width			Depth			Height						W1				W2			
Cont.	1 Min.	kW	Hp	kVA	W1	W2	W	D1	D2	D	H1	H2	H	M1	M2	M	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
																		m^3/s	L/s	CFM		m^3/s	L/s	CFM
25	30	200	260	250	2000	2000	4000	1300	62	1362	2400	330	2730	1700	1360	3060	1	1.0	917	1942	2	1.9	1834	3883
28	33	220	290	280	2000	2000	4000	1300	62	1362	2400	330	2730	1750	1360	3110	1	1.0	917	1942	2	1.9	1834	3883
32	38	250	330	315	2000	2000	4000	1300	62	1362	2400	330	2730	1800	1360	3160	1	1.0	917	1942	2	1.9	1834	3883
36	43	280	370	355	2000	2000	4000	1300	62	1362	2400	330	2730	1850	1360	3210	1	1.0	917	1942	2	1.9	1834	3883
40	48	320	420	400	2000	2000	4000	1300	62	1362	2400	330	2730	1950	1360	3310	1	1.0	917	1942	2	1.9	1834	3883
45	54	360	480	450	2000	2000	4000	1300	62	1362	2400	330	2730	2050	1360	3410	1	1.0	917	1942	2	1.9	1834	3883
50	60	400	530	500	2000	2000	4000	1300	62	1362	2400	330	2730	2150	1360	3510	1	1.0	917	1942	2	1.9	1834	3883
56	67	440	580	560	2000	2000	4000	1300	62	1362	2400	330	2730	2200	1360	3560	1	1.0	917	1942	2	1.9	1834	3883
63	75	500	670	630	2000	2000	4000	1300	62	1362	2400	330	2730	2250	1360	3610	1	1.0	917	1942	2	1.9	1834	3883
71	85	560	750	710	2000	2000	4000	1300	62	1362	2400	330	2730	2400	1360	3760	1	1.0	917	1942	2	1.9	1834	3883
80	96	640	850	800	2000	2000	4000	1300	62	1362	2400	330	2730	2500	1360	3860	1	1.0	917	1942	2	1.9	1834	3883
90	108	720	960	900	2000	2000	4000	1300	62	1362	2400	330	2730	2700	1360	4060	1	1.0	917	1942	2	1.9	1834	3883
100	120	800	1070	1000	2000	2000	4000	1300	62	1362	2400	330	2730	2780	1360	4140	1	1.0	917	1942	2	1.9	1834	3883
112	134	890	1190	1120	2000	2000	4000	1300	62	1362	2400	330	2730	2850	1360	4210	1	1.0	917	1942	2	1.9	1834	3883
125	150	1000	1340	1250	2000	2000	4000	1300	62	1362	2400	330	2730	3100	1360	4460	2	1.9	1834	3883	3	2.8	2750	5824
140	168	1120	1500	1400	2000	2000	4000	1300	62	1362	2400	330	2730	3300	1360	4660	2	1.9	1834	3883	3	2.8	2750	5824
150	180	1200	1600	1500	2000	2000	4000	1300	62	1362	2400	330	2730	3500	1360	4860	2	1.9	1834	3883	3	2.8	2750	5824
160	192	1280	1710	1600	2200	2400	4600	1300	62	1362	2400	330	2730	3700	1740	5440	2	1.9	1834	3883	3	2.8	2750	5824
180	216	1440	1930	1800	2200	2400	4600	1300	62	1362	2400	330	2730	4000	1740	5740	2	1.9	1834	3883	3	2.8	2750	5824
200	240	1600	2140	2000	2200	2400	4600	1300	62	1362	2400	330	2730	4300	1740	6040	2	1.9	1834	3883	3	2.8	2750	5824
225	270	1800	2410	2250	2400	3530	5930	1300	62	1362	2400	330	2730	4900	3020	7920	2	1.9	1834	3883	3	2.8	2750	5824
250	300	2000	2680	2500	2400	3530	5930	1300	62	1362	2400	330	2730	5000	3020	8020	2	2.4	2334	4942	3	3.5	3500	7412
280	336	2240	3000	2800	2400	3530	5930	1300	62	1362	2400	370	2770	5100	3020	8120	2	2.4	2334	4942	3	3.5	3500	7412
300	360	2400	3210	3000	2400	3530	5930	1300	62	1362	2400	370	2770	5500	3020	8520	2	2.4	2334	4942	3	3.5	3500	7412
315	378	2520	3370	3150	2400	3530	5930	1300	62	1362	2400	370	2770	5650	3020	8670	2	2.4	2334	4942	3	3.5	3500	7412
350	420	2800	3750	3500	2400	3530	5930	1300	62	1362	2400	370	2770	5800	3020	8820	2	2.4	2334	4942	3	3.5	3500	7412
380	456	3040	4070	3800	2400	3530	5930	1300	62	1362	2400	370	2770	6000	3020	9020	3	3.5	3500	7412	4	4.7	4667	9883
420	504	3360	4500	4200	2400	3530	5930	1500	62	1562	2400	370	2770	6400	3300	9700	3	3.5	3500	7412	4	4.7	4667	9883

Table 32 - 6600V AC Input/Output (36 Pulse Configuration - 18 Power Cells)

AAA Output Amps		Typical Motor Power Rating		Transformer Rating	Dimensions (mm)									Weight (kg)			Cooling Fans							
					Width			Depth			Height						W1				W2			
Cont.	1 Min.	kW	Hp	kVA	W1	W2	W	D1	D2	D	H1	H2	H	M1	M2	M	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
																		m^3/s	L/s	CFM		m^3/s	L/s	CFM
25	30	220	290	280	2000	2000	4000	1300	62	1362	2400	330	2730	1750	1360	3110	1	1.0	917	1942	1	1.9	1834	3883
28	33	250	330	320	2000	2000	4000	1300	62	1362	2400	330	2730	1800	1360	3160	1	1.0	917	1942	1	1.9	1834	3883
32	38	280	370	355	2000	2000	4000	1300	62	1362	2400	330	2730	1850	1360	3210	1	1.0	917	1942	1	1.9	1834	3883
36	43	320	420	400	2000	2000	4000	1300	62	1362	2400	330	2730	1950	1360	3310	1	1.0	917	1942	1	1.9	1834	3883
40	48	360	480	450	2000	2000	4000	1300	62	1362	2400	330	2730	2050	1360	3410	1	1.0	917	1942	1	1.9	1834	3883
45	54	400	530	500	2000	2000	4000	1300	62	1362	2400	330	2730	2150	1360	3510	1	1.0	917	1942	1	1.9	1834	3883
50	60	440	580	560	2000	2000	4000	1300	62	1362	2400	330	2730	2200	1360	3560	1	1.0	917	1942	1	1.9	1834	3883
56	67	500	670	630	2000	2000	4000	1300	62	1362	2400	330	2730	2250	1360	3610	1	1.0	917	1942	1	1.9	1834	3883
63	75	560	750	710	2000	2000	4000	1300	62	1362	2400	330	2730	2400	1360	3760	1	1.0	917	1942	1	1.9	1834	3883
71	85	640	850	800	2000	2000	4000	1300	62	1362	2400	330	2730	2500	1360	3860	1	1.0	917	1942	1	1.9	1834	3883
80	96	720	960	900	2000	2000	4000	1300	62	1362	2400	330	2730	2700	1360	4060	1	1.0	917	1942	1	1.9	1834	3883
90	108	800	1070	1000	2000	2000	4000	1300	62	1362	2400	330	2730	2780	1360	4140	1	1.0	917	1942	1	1.9	1834	3883
100	120	890	1190	1120	2000	2000	4000	1300	62	1362	2400	330	2730	2850	1360	4210	1	1.0	917	1942	1	1.9	1834	3883
112	134	1000	1340	1250	2000	2000	4000	1300	62	1362	2400	330	2730	3100	1360	4460	2	1.9	1834	3883	3	2.8	2750	5824
125	150	1120	1500	1400	2000	2000	4000	1300	62	1362	2400	330	2730	3300	1360	4660	2	1.9	1834	3883	3	2.8	2750	5824
140	168	1280	1710	1600	2200	2000	4200	1300	62	1362	2400	330	2730	3500	1360	4860	2	1.9	1834	3883	3	2.8	2750	5824
150	180	1360	1820	1700	2200	2000	4200	1300	62	1362	2400	330	2730	3700	1740	5440	2	1.9	1834	3883	3	2.8	2750	5824
160	192	1440	1930	1800	2200	2400	4600	1300	62	1362	2400	330	2730	4000	1740	5740	2	1.9	1834	3883	3	2.8	2750	5824
180	216	1600	2140	2000	2200	2400	4600	1300	62	1362	2400	330	2730	4300	1740	6040	2	1.9	1834	3883	3	2.8	2750	5824
200	240	1800	2410	2250	2200	2400	4600	1300	62	1362	2400	330	2730	4900	3020	7920	2	1.9	1834	3883	3	2.8	2750	5824
225	270	2000	2680	2500	2400	3530	5930	1300	62	1362	2400	330	2730	5000	3020	8020	2	2.4	2334	4942	3	3.5	3500	7412
250	300	2240	3000	2800	2400	3530	5930	1300	62	1362	2400	370	2770	5100	3020	8120	2	2.4	2334	4942	3	3.5	3500	7412
280	336	2520	3370	3150	2400	3530	5930	1300	62	1362	2400	370	2770	5500	3020	8520	2	2.4	2334	4942	3	3.5	3500	7412
300	360	2680	3590	3350	2400	3530	5930	1300	62	1362	2400	370	2770	5650	3020	8670	2	2.4	2334	4942	3	3.5	3500	7412
315	378	2800	3750	3500	2400	3530	5930	1300	62	1362	2400	370	2770	5800	3020	8820	2	2.4	2334	4942	3	3.5	3500	7412
350	420	3200	4280	4000	2400	3530	5930	1500	62	1562	2400	370	2770	6000	3300	9300	3	3.5	3500	7412	4	4.7	4667	9883
380	456	3360	4500	4200	2400	3530	5930	1500	62	1562	2400	370	2770	6400	3300	9700	3	3.5	3500	7412	4	4.7	4667	9883
420	504	3720	4980	4650	2400	3530	5930	1500	62	1562	2400	370	2770	6800	3480	10,280	3	3.5	3500	7412	4	4.7	4667	9883

Table 33 - 10,000V AC Input/Output (54 Pulse Configuration - 27 Power Cells)

A A A Output Amps		Typical Motor Power Rating		Transformer Rating	Dimensions (mm)									Weight (kg)			Cooling Fans							
					Width			Depth			Height						W1				W2			
Cont.	1 Min.	kW	Hp	kVA	W1	W2	W	D1	D2	D	H1	H2	H	M1	M2	M	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
																		m^3/s	L/s	CFM		m^3/s	L/s	CFM
15	18	200	260	250	2000	2400	4400	1300	62	1362	2400	330	2730	1700	1740	3440	1	1.0	917	1942	2	1.9	1834	3883
16	19	220	290	280	2000	2400	4400	1300	62	1362	2400	330	2730	1750	1740	3490	1	1.0	917	1942	2	1.9	1834	3883
18	21	250	330	315	2000	2400	4400	1300	62	1362	2400	330	2730	1800	1740	3540	1	1.0	917	1942	2	1.9	1834	3883
20	24	280	370	355	2000	2400	4400	1300	62	1362	2400	330	2730	1850	1740	3590	1	1.0	917	1942	2	1.9	1834	3883
24	28	320	420	400	2000	2400	4400	1300	62	1362	2400	330	2730	1950	1740	3690	1	1.0	917	1942	2	1.9	1834	3883
26	31	360	480	450	2000	2400	4400	1300	62	1362	2400	330	2730	2050	1740	3790	1	1.0	917	1942	2	1.9	1834	3883
30	36	400	530	500	2000	2400	4400	1300	62	1362	2400	330	2730	2150	1740	3890	1	1.0	917	1942	2	1.9	1834	3883
33	39	440	580	560	2000	2400	4400	1300	62	1362	2400	330	2730	2200	1740	3940	1	1.0	917	1942	2	1.9	1834	3883
36	43	500	670	630	2000	2400	4400	1300	62	1362	2400	330	2730	2250	1740	3990	1	1.0	917	1942	2	1.9	1834	3883
41	49	560	750	710	2000	2400	4400	1300	62	1362	2400	330	2730	2400	1740	4140	1	1.0	917	1942	2	1.9	1834	3883
48	57	640	850	800	2000	2400	4400	1300	62	1362	2400	330	2730	2500	1740	4240	1	1.0	917	1942	2	1.9	1834	3883
54	64	720	960	900	2000	2400	4400	1300	62	1362	2400	330	2730	2700	1740	4440	1	1.0	917	1942	2	1.9	1834	3883
60	72	800	1070	1000	2000	2400	4400	1300	62	1362	2400	330	2730	2780	1740	4520	1	1.0	917	1942	2	1.9	1834	3883
66	79	890	1190	1120	2000	2400	4400	1300	62	1362	2400	330	2730	2850	1740	4590	2	1.9	1834	3883	3	2.8	2750	5824
75	90	1000	1340	1250	2000	2400	4400	1300	62	1362	2400	330	2730	3100	1740	4840	2	1.9	1834	3883	3	2.8	2750	5824
84	100	1120	1500	1400	2000	2400	4400	1300	62	1362	2400	330	2730	3300	1740	5040	2	1.9	1834	3883	3	2.8	2750	5824
96	115	1280	1710	1600	2200	2400	4600	1300	62	1362	2400	330	2730	3700	1740	5440	2	1.9	1834	3883	3	2.8	2750	5824
108	129	1440	1930	1800	2200	2400	4600	1300	62	1362	2400	330	2730	4000	1740	5740	2	1.9	1834	3883	3	2.8	2750	5824
120	144	1600	2140	2000	2200	2400	4600	1300	62	1362	2400	330	2730	4300	1740	6040	2	1.9	1834	3883	3	2.8	2750	5824
138	165	1840	2460	2300	2200	2400	4600	1300	62	1362	2400	330	2730	4700	1740	6440	2	1.9	1834	3883	3	2.8	2750	5824
150	180	2000	2680	2500	2200	2400	4600	1300	62	1362	2400	330	2730	4800	1740	6540	2	1.9	1834	3883	3	2.8	2750	5824
168	201	2240	3000	2800	2400	4140	6540	1300	62	1362	2400	370	2770	5100	3210	8310	2	2.4	2334	4942	3	3.5	3500	7412
180	216	2400	3210	3000	2400	4140	6540	1300	62	1362	2400	370	2770	5100	3210	8310	2	2.4	2334	4942	3	3.5	3500	7412
192	230	2560	3430	3200	2400	4140	6540	1300	62	1362	2400	370	2770	5650	3210	8860	2	2.4	2334	4942	3	3.5	3500	7412
200	240	2840	3800	3550	2400	4140	6540	1300	62	1362	2400	370	2770	5800	3210	9010	2	2.4	2334	4942	3	3.5	3500	7412
225	270	3200	4280	4000	2400	4890	7290	1500	62	1562	2400	370	2770	6350	3980	10,330	3	3.5	3500	7412	6	5.5	5500	11,647
250	300	3600	4820	4500	2400	4890	7290	1500	62	1562	2400	370	2770	6750	3980	10,730	3	3.5	3500	7412	6	5.5	5500	11,647
280	336	4000	5360	5000	2400	4890	7290	1500	62	1562	2400	370	2770	6950	3980	10,930	3	3.5	3500	7412	6	5.5	5500	11,647
315	378	4480	6000	5600	3000	4890	7890	1700	62	1762	2700	370	3070	9570	4300	13,870	4	4.7	4667	9883	6	7.0	7000	14,824
380	456	5080	6800	6350	3000	4890	7890	1700	62	1762	2700	370	3070	11,100	4300	15,400	4	4.7	4667	9883	6	7.0	7000	14,824
420	504	5600	7500	7000	3000	4890	7890	1700	62	1762	2700	370	3070	11,800	4700	16,500	5	5.9	5834	12,353	6	7	7000	14,824

Table 34 - 11,000V AC Input / 3300V Output (18 Pulse Configuration - 9 Power Cells)

A A A Output Amps		Typical Motor Power Rating		Transformer Rating	Dimensions (mm)									Weight (kg)			Cooling Fans							
					Width			Depth			Height						W1				W2			
Cont.	1 Min.	kW	Hp	kVA	W1	W2	W	D1	D2	D	H1	H2	H	M1	M2	M	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
																		m^3/s	L/s	CFM		m^3/s	L/s	CFM
80	96	360	480	450	2000	1780	3780	1300	62	1362	2400	330	2730	2050	1080	3130	1	1.0	917	1942	2	1.9	1834	3883
90	108	400	530	500	2000	1780	3780	1300	62	1362	2400	330	2730	2150	1080	3230	1	1.0	917	1942	2	1.9	1834	3883
100	120	440	580	560	2000	1780	3780	1300	62	1362	2400	330	2730	2200	1080	3280	1	1.0	917	1942	2	1.9	1834	3883
112	134	500	670	630	2000	1780	3780	1300	62	1362	2400	330	2730	2250	1080	3330	1	1.0	917	1942	2	1.9	1834	3883
125	150	560	750	710	2000	1780	3780	1300	62	1362	2400	330	2730	2400	1080	3480	1	1.0	917	1942	2	1.9	1834	3883
140	168	640	850	800	2000	1780	3780	1300	62	1362	2400	330	2730	2450	1080	3530	1	1.0	917	1942	2	1.9	1834	3883
150	180	680	910	850	2000	1780	3780	1300	62	1362	2400	330	2730	2600	1080	3680	1	1.0	917	1942	2	1.9	1834	3883
160	192	720	960	900	2000	1780	3780	1300	62	1362	2400	330	2730	2700	1170	3870	1	1.0	917	1942	2	1.9	1834	3883
180	216	800	1070	1000	2000	1780	3780	1300	62	1362	2400	330	2730	2800	1170	3970	1	1.0	917	1942	2	1.9	1834	3883
200	240	890	1190	1120	2000	1780	3780	1300	62	1362	2400	330	2730	3250	1170	4420	1	1.0	917	1942	2	1.9	1834	3883
225	270	1010	1350	1265	2400	2000	4400	1300	62	1362	2400	330	2730	3500	1360	4860	2	1.9	1834	3883	3	2.8	2750	5824
250	300	1120	1500	1400	2400	2000	4400	1300	62	1362	2400	330	2730	3700	1360	5060	2	1.9	1834	3883	3	2.8	2750	5824
280	336	1260	1680	1575	2400	2000	4400	1300	62	1362	2400	330	2730	3900	1360	5260	2	1.9	1834	3883	3	2.8	2750	5824
300	360	1320	1760	1650	2400	2000	4400	1300	62	1362	2400	330	2730	4000	1360	5360	2	1.9	1834	3883	3	2.8	2750	5824
315	378	1400	1870	1750	2400	2000	4400	1300	62	1362	2400	330	2730	4100	1360	5460	2	1.9	1834	3883	3	2.8	2750	5824
350	420	1560	2090	1950	2400	2000	4400	1300	62	1362	2400	330	2730	4500	1360	5860	2	1.9	1834	3883	3	2.8	2750	5824
380	456	1720	2300	2150	2400	2000	4400	1300	62	1362	2400	330	2730	4700	1360	6060	2	1.9	1834	3883	3	2.8	2750	5824

Table 35 - 11,000V AC Input / 6600V Output (36 Pulse Configuration - 18 Power Cells)

AAA Output Amps		Typical Motor Power Rating		Transformer Rating	Dimensions (mm)									Weight (kg)			Cooling Fans							
					Width			Depth			Height						W1				W2			
Cont.	1 Min.	kW	Hp	kVA	W1	W2	W	D1	D2	D	H1	H2	H	M1	M2	M	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
																		m^3/s	L/s	CFM		m^3/s	L/s	CFM
25	30	220	290	280	2000	2000	4000	1300	62	1362	2400	330	2730	1900	1360	3260	1	1.0	917	1942	2	1.9	1834	3883
28	33	250	330	320	2000	2000	4000	1300	62	1362	2400	330	2730	1950	1360	3310	1	1.0	917	1942	2	1.9	1834	3883
32	38	280	370	355	2000	2000	4000	1300	62	1362	2400	330	2730	2000	1360	3360	1	1.0	917	1942	2	1.9	1834	3883
36	43	320	420	400	2000	2000	4000	1300	62	1362	2400	330	2730	2100	1360	3460	1	1.0	917	1942	2	1.9	1834	3883
40	48	360	480	450	2000	2000	4000	1300	62	1362	2400	330	2730	2200	1360	3560	1	1.0	917	1942	2	1.9	1834	3883
45	54	400	530	500	2000	2000	4000	1300	62	1362	2400	330	2730	2300	1360	3660	1	1.0	917	1942	2	1.9	1834	3883
50	60	440	580	560	2000	2000	4000	1300	62	1362	2400	330	2730	2350	1360	3710	1	1.0	917	1942	2	1.9	1834	3883
56	67	500	670	630	2000	2000	4000	1300	62	1362	2400	330	2730	2400	1360	3760	1	1.0	917	1942	2	1.9	1834	3883
63	75	560	750	710	2000	2000	4000	1300	62	1362	2400	330	2730	2550	1360	3910	1	1.0	917	1942	2	1.9	1834	3883
71	85	640	850	800	2000	2000	4000	1300	62	1362	2400	330	2730	2650	1360	4010	1	1.0	917	1942	2	1.9	1834	3883
80	96	720	960	900	2000	2000	4000	1300	62	1362	2400	330	2730	2850	1360	4210	1	1.0	917	1942	2	1.9	1834	3883
90	108	800	1070	1000	2000	2000	4000	1300	62	1362	2400	330	2730	2830	1360	4190	1	1.0	917	1942	2	1.9	1834	3883
100	120	890	1190	1120	2000	2000	4000	1300	62	1362	2400	330	2730	3000	1360	4360	1	1.0	917	1942	2	1.9	1834	3883
112	134	1000	1340	1250	2200	2000	4200	1300	62	1362	2400	330	2730	3250	1360	4610	2	1.9	1834	3883	3	2.8	2750	5824
125	150	1120	1500	1400	2200	2000	4200	1300	62	1362	2400	330	2730	3450	1360	4810	2	1.9	1834	3883	3	2.8	2750	5824
140	168	1280	1710	1600	2200	2000	4200	1300	62	1362	2400	330	2730	3650	1360	5010	2	1.9	1834	3883	3	2.8	2750	5824
150	180	1360	1820	1700	2200	2000	4200	1300	62	1362	2400	330	2730	3850	1740	5590	2	1.9	1834	3883	3	2.8	2750	5824
160	192	1440	1930	1800	2200	2400	4600	1300	62	1362	2400	330	2730	4150	1740	5890	2	1.9	1834	3883	3	2.8	2750	5824
180	216	1600	2140	2000	2200	2400	4600	1300	62	1362	2400	330	2730	4450	1740	6190	2	1.9	1834	3883	3	2.8	2750	5824
200	240	1800	2410	2250	2200	2400	4600	1300	62	1362	2400	330	2730	5050	3020	8070	2	1.9	1834	3883	3	2.8	2750	5824
225	270	2000	2680	2500	2400	3530	5930	1300	62	1362	2400	330	2730	5150	3020	8170	2	2.4	2334	4942	3	3.5	3500	7412
250	300	2240	3000	2800	2400	3530	5930	1300	62	1362	2400	370	2770	5250	3020	8270	2	2.4	2334	4942	3	3.5	3500	7412
280	336	2520	3370	3150	2400	3530	5930	1300	62	1362	2400	370	2770	5400	3020	8420	2	2.4	2334	4942	3	3.5	3500	7412
300	360	2680	3590	3350	2400	3530	5930	1300	62	1362	2400	370	2770	5800	3020	8820	2	2.4	2334	4942	3	3.5	3500	7412
315	378	2800	3750	3500	2400	3530	5930	1300	62	1362	2400	370	2770	5950	3020	8970	2	2.4	2334	4942	3	3.5	3500	7412
350	420	3200	4280	4000	2400	3530	5930	1500	62	1562	2400	370	2770	6150	3300	9450	3	3.5	3500	7412	4	4.7	4667	9883
380	456	3360	4500	4200	2400	3530	5930	1500	62	1562	2400	370	2770	6550	3300	9850	3	3.5	3500	7412	4	4.7	4667	9883
420	504	3720	4980	4650	2400	3530	5930	1500	62	1562	2400	370	2770	6950	3300	10,250	3	3.5	3500	7412	4	4.7	4667	9883

PowerFlex 6000 Dimensions and Weights (For UL)

Overview

Dimensions (mm)	
W1	Width of Cabinet 1 (Isolation Transformer section)
W2	Width of Cabinet 2 (Power Module section and Low Voltage Control section)
W	Total width
D1	Depth of cabinet base (footprint)
D2	Depth of doors beyond cabinet base
D	Total depth (including door depth)
H1	Height of Cabinet
H2	Height of Fan
H	Total height (including fan)

Weight (kg)	
M1	Weight of Cabinet 1 (Isolation Transformer section)
M2	Weight of Cabinet 2 (Power Module section and Low Voltage Control section)
M	Total weight

Table 36 - 2400V Input & 2300/2400V AC Output (18 Pulse Configuration - 9 Power Cells)

Catalog Number	Motor Amps		Typical Motor Power Rating		Transformer Rating	Transformer Weight	Power Cell Rating	Structure Code	Number of Fans	Power Cell	Dimensions, mm (in.)										Weight, kg (lbs)			W1					W2			
											Width				Depth			Height							Requirement Total Air	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
	Cont.	1 Min.	kW	Hp	kVA	kg	Amps			HxWxD, mm (in.)	W1	W2a	W2b	W	D1	D2	D	H1	H2	H	M1	M2	M			m^3/s	L/s	cfm		m^3/s	L/s	cfm
6000U-A39DA-AJ6A	39	46	137	184	250	1000	40	STR_9	2-RH45	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	950 (37.4)	600 (23.62)	3550 (139.76)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	380 (15)	2680 (105.51)	2000 (4409)	1360 (2998)	3360 (7407)	934.8	1	1.167	1167	2471	1	1.167	1167	2471
6000U-A67DA-AJ6A	67	80	235	315	400	1200	75	STR_9	2-RH45	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	950 (37.4)	600 (23.62)	3550 (139.76)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	380 (15)	2680 (105.51)	2400 (4850)	1360 (2998)	3760 (7848)	1495.8	1	1.167	1167	2471	1	1.167	1167	2471
6000U-A89DA-AJ6A	89	106	313	420	450	1400	100	STR_9	2-RH45	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	950 (37.4)	600 (23.62)	3550 (139.76)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	380 (15)	2680 (105.51)	2500 (5291)	1360 (2998)	3860 (8289)	1682.7	1	1.167	1167	2471	1	1.167	1167	2471
6000U-A100DA-AJ6A	100	120	350	469	500	1500	100	STR_9	2-RH45	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	950 (37.4)	600 (23.62)	3550 (139.76)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	380 (15)	2680 (105.51)	2600 (5511)	1360 (2998)	3960 (8509)	1869.7	1	1.167	1167	2471	1	1.167	1167	2471
6000U-A111DA-AJ6A	111	133	389	522	600	1600	120	STR_9	2-RH45	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	950 (37.4)	600 (23.62)	3550 (139.76)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	380 (15)	2680 (105.51)	2700 (5732)	1360 (2998)	4060 (8730)	2243.6	1	1.167	1167	2471	1	1.167	1167	2471
6000U-A134DA-AJ6A	134	160	470	629	700	1700	150	STR_9	2-RH45	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	950 (37.4)	600 (23.62)	3550 (139.76)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	380 (15)	2680 (105.51)	2800 (5952)	1360 (2998)	4160 (8950)	2617.6	1	1.167	1167	2471	1	1.167	1167	2471
6000U-A155DA-AJ6A	155	186	545	730	800	1800	180	STR_10	4-RH40	420x262x619 (16.53x10.31x24.37)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2900 (6172)	1450 (3196)	4350 (9368)	2991.5	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A178DA-AJ6A	178	213	626	839	900	1900	180	STR_10	4-RH40	420x262x619 (16.53x10.31x24.37)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3000 (6393)	1450 (3196)	4450 (9589)	3365.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A200DA-AJ6A	200	240	701	941	1000	2000	200	STR_10	4-RH40	420x262x619 (16.53x10.31x24.37)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3100 (6613)	1450 (3196)	4550 (9809)	3739.4	2	1.9	1834	3883	2	1.9	1834	3883

Table 37 - 4160V Input & 4000/4160V AC Output (24 Pulse Configuration - 12 Power Cells)

Catalog Number	Motor Amps		Typical Motor Power Rating		Transformer Rating	Transformer Weight	Power Cell Rating	Structure Code	Number of Fans	Power Cell	Dimensions, mm (in.)										Weight, kg (lbs)			W1					W2			
											Width				Depth			Height							Requirement Total Air	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
	Cont.	1 Min.	kW	Hp	kVA	kg	Amps			HxWxD, mm (in.)	W1	W2a	W2b	W	D1	D2	D	H1	H2	H	M1	M2	M			m^3/s	L/s	cfm		m^3/s	L/s	cfm
6000U-A37DE-AJ6E	39	44	225	300	300	1200	40	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2200 (4840)	1480 (3256)	3680 (8096)	1121.8	1	1	917	1942	2	1.9	1834	3883
6000U-A49DE-AJ6E	49	58	300	400	400	1400	75	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2400 (5280)	1480 (3256)	3880 (8536)	1495.8	1	1	917	1942	2	1.9	1834	3883
6000U-A55DE-AJ6E	55	66	335	450	450	1500	75	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2500 (5500)	1480 (3256)	3980 (8756)	1682.7	1	1	917	1942	2	1.9	1834	3883
6000U-A61DE-AJ6E	61	73	373	500	500	1600	75	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2600 (5720)	1480 (3256)	4080 (8976)	1869.7	1	1	917	1942	2	1.9	1834	3883
6000U-A74DE-AJ6E	74	88	450	600	600	1700	75	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2700 (5940)	1480 (3256)	4180 (9196)	2243.6	1	1	917	1942	2	1.9	1834	3883
6000U-A86DE-AJ6E	86	103	522	700	700	1800	100	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2800 (6160)	1480 (3256)	4280 (9416)	2617.6	1	1	917	1942	2	1.9	1834	3883
6000U-A99DE-AJ6E	99	118	600	800	800	1900	100	STR_6	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2900 (6380)	1480 (3256)	4380 (9636)	2991.5	1	1	917	1942	2	1.9	1834	3883
6000U-A110DE-AJ6E	110	132	670	900	900	2000	120	STR_7	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3000 (6600)	1480 (3256)	4480 (9856)	3365.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A123DE-AJ6E	123	147	750	1000	1000	2100	150	STR_7	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3100 (6820)	1480 (3256)	4580 (10076)	3739.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A135DE-AJ6E	135	162	820	1100	1100	2200	150	STR_7	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3200 (7040)	1480 (3256)	4680 (10296)	4113.3	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A145DE-AJ6E	145	174	880	1180	1180	2300	150	STR_7	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1190 (46.85)	600 (23.62)	3790 (149.21)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3300 (7260)	1480 (3256)	4780 (10516)	4412.5	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A153DE-AJ6E	153	183	933	1250	1250	2350	180	STR_8	4-RH40	420x262x619 (16.53x10.31x24.37)	2200 (86.61)	1580 (62.2)	600 (23.62)	4380 (172.44)	1300 (90.55)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3400 (7480)	1600 (3520)	5000 (11000)	4674.2	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A159DE-AJ6E	159	190	970	1300	1300	2500	180	STR_8	4-RH40	420x262x619 (16.53x10.31x24.37)	2200 (86.61)	1580 (62.2)	600 (23.62)	4380 (172.44)	1300 (90.55)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3550 (7810)	1600 (3520)	5150 (11330)	4861.2	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A184DE-AJ6E	184	220	1120	1500	1500	2600	200	STR_8	4-RH40	420x262x619 (16.53x10.31x24.37)	2200 (86.61)	1580 (62.2)	600 (23.62)	4380 (172.44)	1300 (90.55)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3650 (8030)	1600 (3520)	5250 (11550)	5609.1	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A200DE-AJ6E	200	240	1220	1635	1635	2800	200	STR_8	4-RH40	420x262x619 (16.53x10.31x24.37)	2200 (86.61)	1580 (62.2)	600 (23.62)	4380 (172.44)	1300 (90.55)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3850 (8470)	1600 (3520)	5450 (11990)	6113.9	2	1.9	1834	3883	2	1.9	1834	3883

Table 38 - 6600V Input & 6000V AC Output (36 Pulse Configuration - 18 Power Cells)

Catalog Number	Motor Amps		Typical Motor Power Rating		Transformer Rating	Transformer Weight	Power Cell Rating	Structure Code	Number of Fans	Power Cell	Dimensions, mm (in.)										Weight, kg (lbs)			W1					W2			
											Width				Depth			Height							Requirement Total Air	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
	Cont.	1 Min.	kW	Hp	kVA	kg	Amps			HxWxD, mm (in.)	W1	W2a	W2b	W	D1	D2	D	H1	H2	H	M1	M2	M			m^3/s	L/s	cfm		m^3/s	L/s	cfm
6000U-A34DJ-AJ6F	34	40	300	400	400	1400	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2400 (5280)	1920 (4224)	4320 (9504)	1495.8	1	1	917	1942	2	1.9	1834	3883
6000U-A38DJ-AJ6F	38	45	335	450	450	1500	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2500 (5500)	1920 (4224)	4420 (9724)	1682.7	1	1	917	1942	2	1.9	1834	3883
6000U-A42DJ-AJ6F	42	50	373	500	500	1600	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2600 (5720)	1920 (4224)	4520 (9944)	1869.7	1	1	917	1942	2	1.9	1834	3883
6000U-A51DJ-AJ6F	51	61	450	600	600	1700	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2700 (5940)	1920 (4224)	4620 (10164)	2243.6	1	1	917	1942	2	1.9	1834	3883
6000U-A59DJ-AJ6F	59	70	522	700	700	1800	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2800 (6160)	1920 (4224)	4720 (10384)	2617.6	1	1	917	1942	2	1.9	1834	3883
6000U-A68DJ-AJ6F	68	81	600	800	800	1900	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2900 (6380)	1920 (4224)	4820 (10604)	2991.5	1	1	917	1942	2	1.9	1834	3883
6000U-A76DJ-AJ6F	76	91	670	900	900	2000	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3000 (6600)	1920 (4224)	4920 (10824)	3365.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A85DJ-AJ6F	85	102	750	1000	1000	2100	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3100 (6820)	1920 (4224)	5020 (11044)	3739.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A93DJ-AJ6F	93	111	820	1100	1100	2200	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3200 (7040)	1920 (4224)	5120 (11264)	4113.3	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A100DJ-AJ6F	100	120	880	1180	1180	2300	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3300 (7260)	1920 (4224)	5220 (11484)	4412.5	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A106DJ-AJ6F	106	127	933	1250	1250	2350	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3400 (7480)	1920 (4424)	5320 (11704)	4674.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A110DJ-AJ6F	110	132	970	1300	1300	2500	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3550 (7810)	1920 (4224)	5470 (12034)	4861.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A128DJ-AJ6F	128	153	1120	1500	1500	2600	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3650 (8030)	1920 (4224)	5570 (12254)	5609.1	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A139DJ-AJ6F	139	166	1220	1635	1635	2800	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3850 (8470)	1920 (4224)	5770 (12694)	6113.9	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A148DJ-AJ6F	148	177	1300	1750	1750	3000	150	STR_5	6-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4050 (8910)	1920 (4224)	5970 (13134)	6543.9	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A171DJ-AJ6F	171	205	1500	2000	2000	3700	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4800 (10560)	1360 (2992)	6160 (13552)	7478.8	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A191DJ-AJ6F	191	229	1680	2250	2250	3800	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4900 (10780)	1360 (2992)	6260 (13772)	8413.6	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A200DJ-AJ6F	200	240	1753	2350	2350	3900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	5000 (11000)	1740 (3828)	6740 (14828)	8787.5	3	2.8	2750	5824	3	2.8	2750	5824

Table 39 - 6600V Input & 6300V AC Output (36 Pulse Configuration - 18 Power Cells)

Catalog Number	Motor Amps		Typical Motor Power Rating		Transformer Rating	Transformer Weight	Power Cell Rating	Structure Code	Number of Fans	Power Cell	Dimensions, mm (in.)										Weight, kg (lbs)			W1					W2			
											Width				Depth			Height							Requirement Total Air	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
	Cont.	1 Min.	kW	Hp	kVA	kg	Amps			HxWxD, mm (in.)	W1	W2a	W2b	W	D1	D2	D	H1	H2	H	M1	M2	M			m^3/s	L/s	cfm		m^3/s	L/s	cfm
6000U-A31DJ-AJ6H	31	37	286	384	400	1400	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2400 (5280)	1920 (4224)	4320 (9504)	1495.8	1	1	917	1942	2	1.9	1834	3883
6000U-A35DJ-AJ6H	35	42	320	429	450	1500	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2500 (5500)	1920 (4224)	4420 (9724)	1682.7	1	1	917	1942	2	1.9	1834	3883
6000U-A39DJ-AJ6H	39	46	356	477	500	1600	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2600 (5720)	1920 (4224)	4520 (9944)	1869.7	1	1	917	1942	2	1.9	1834	3883
6000U-A47DJ-AJ6H	47	56	430	576	600	1700	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2700 (5940)	1920 (4224)	4620 (10164)	2243.6	1	1	917	1942	2	1.9	1834	3883
6000U-A54DJ-AJ6H	54	64	498	668	700	1800	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2800 (6160)	1920 (4224)	4720 (10384)	2617.6	1	1	917	1942	2	1.9	1834	3883
6000U-A62DJ-AJ6H	62	74	573	768	800	1900	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2900 (6380)	1920 (4224)	4820 (10604)	2991.5	1	1	917	1942	2	1.9	1834	3883
6000U-A69DJ-AJ6H	69	82	640	857	900	2000	75	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3000 (6600)	1920 (4224)	4920 (10824)	3365.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A78DJ-AJ6H	78	93	716	960	1000	2100	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3100 (6820)	1920 (4224)	5020 (11044)	3739.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A85DJ-AJ6H	85	102	783	1049	1100	2200	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3200 (7040)	1920 (4224)	5120 (11264)	4113.3	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A97DJ-AJ6H	97	116	891	1194	1250	2350	100	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3400 (7480)	1920 (4424)	5320 (11704)	4674.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A100DJ-AJ6H	100	120	926	1241	1300	2500	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3550 (7810)	1920 (4224)	5470 (12034)	4861.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A116DJ-AJ6H	116	139	1069	1433	1500	2600	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3650 (8030)	1920 (4224)	5570 (12254)	5609.1	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A126DJ-AJ6H	126	151	1165	1561	1635	2800	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3850 (8470)	1920 (4224)	5770 (12694)	6113.9	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A135DJ-AJ6H	135	162	1241	1663	1750	3000	150	STR_5	6-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4050 (8910)	1920 (4224)	5970 (13134)	6543.9	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A155DJ-AJ6H	155	186	1432	1919	2000	3700	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4800 (10560)	1360 (2992)	6160 (13552)	7478.8	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A174DJ-AJ6H	174	208	1604	2150	2250	3800	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4900 (10780)	1360 (2992)	6260 (13772)	8413.6	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A182DJ-AJ6H	182	218	1673	2243	2350	3900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	5000 (11000)	1740 (3828)	6740 (14828)	8787.5	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A200DJ-AJ6H	200	240	1852	2482	2600	4900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	6000 (13200)	1740 (3828)	7740 (17028)	9722.4	3	2.8	2750	5824	3	2.8	2750	5824

Table 40 - 6600V Input & 6600V AC Output (36 Pulse Configuration - 18 Power Cells)

Catalog Number	Motor Amps		Typical Motor Power Rating		Transformer Rating	Transformer Weight	Power Cell Rating	Structure Code	Number of Fans	Power Cell	Dimensions, mm (in.)										Weight, kg (lbs)			W1					W2			
											Width				Depth			Height							Requirement Total Air	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
	Cont.	1 Min.	kW	Hp	kVA	kg	Amps			HxWxD, mm (in.)	W1	W2a	W2b	W	D1	D2	D	H1	H2	H	M1	M2	M			m^3/s	L/s	cfm		m^3/s	L/s	cfm
6000U-A31DJ-AJ6J	31	37	300	400	400	1400	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2400 (5280)	1920 (4224)	4320 (9504)	1495.8	1	1	917	1942	2	1.9	1834	3883
6000U-A35DJ-AJ6J	35	42	335	450	450	1500	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2500 (5500)	1920 (4224)	4420 (9724)	1682.7	1	1	917	1942	2	1.9	1834	3883
6000U-A39DJ-AJ6J	39	46	373	500	500	1600	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2600 (5720)	1920 (4224)	4520 (9944)	1869.7	1	1	917	1942	2	1.9	1834	3883
6000U-A47DJ-AJ6J	47	56	450	600	600	1700	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2700 (5940)	1920 (4224)	4620 (10164)	2243.6	1	1	917	1942	2	1.9	1834	3883
6000U-A54DJ-AJ6J	54	64	522	700	700	1800	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2800 (6160)	1920 (4224)	4720 (10384)	2617.6	1	1	917	1942	2	1.9	1834	3883
6000U-A62DJ-AJ6J	62	74	600	800	800	1900	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2900 (6380)	1920 (4224)	4820 (10604)	2991.5	1	1	917	1942	2	1.9	1834	3883
6000U-A69DJ-AJ6J	69	82	670	900	900	2000	75	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3000 (6600)	1920 (4224)	4920 (10824)	3365.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A78DJ-AJ6J	78	93	750	1000	1000	2100	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3100 (6820)	1920 (4224)	5020 (11044)	3739.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A85DJ-AJ6J	85	102	820	1100	1100	2200	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3200 (7040)	1920 (4224)	5120 (11264)	4113.3	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A97DJ-AJ6J	97	116	933	1250	1250	2350	100	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3400 (7480)	1920 (4424)	5320 (11704)	4674.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A100DJ-AJ6J	100	120	970	1300	1300	2500	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3550 (7810)	1920 (4224)	5470 (12034)	4861.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A116DJ-AJ6J	116	139	1120	1500	1500	2600	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3650 (8030)	1920 (4224)	5570 (12254)	5609.1	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A126DJ-AJ6J	126	151	1220	1635	1635	2800	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3850 (8470)	1920 (4224)	5770 (12694)	6113.9	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A135DJ-AJ6Jj	135	162	1300	1750	1750	3000	150	STR_5	6-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4050 (8910)	1920 (4224)	5970 (13134)	6543.9	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A155DJ-AJ6J	155	186	1500	2000	2000	3700	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4800 (10560)	1360 (2992)	6160 (13552)	7478.8	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A174DJ-AJ6J	174	208	1680	2250	2250	3800	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4900 (10780)	1360 (2992)	6260 (13772)	8413.6	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A182DJ-AJ6J	182	218	1753	2350	2350	3900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	5000 (11000)	1740 (3828)	6740 (14828)	8787.5	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A200DJ-AJ6J	200	240	1940	2600	2600	4900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	6000 (13200)	1740 (3828)	7740 (17028)	9722.4	3	2.8	2750	5824	3	2.8	2750	5824

Table 41 - 6900V Input & 6000V AC Output (36 Pulse Configuration - 18 Power Cells)

Catalog Number	Motor Amps		Typical Motor Power Rating		Transformer Rating	Transformer Weight	Power Cell Rating	Structure Code	Number of Fans	Power Cell	Dimensions, mm (in.)										Weight, kg (lbs)			W1					W2			
											Width				Depth			Height							Requirement Total Air	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
	Cont.	1 Min.	kW	Hp	kVA	kg	Amps			HxWxD, mm (in.)	W1	W2a	W2b	W	D1	D2	D	H1	H2	H	M1	M2	M			m^3/s	L/s	cfm		m^3/s	L/s	cfm
6000U-A34DK-AJ6F	34	40	300	400	400	1400	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2400 (5280)	1920 (4224)	4320 (9504)	1495.8	1	1	917	1942	2	1.9	1834	3883
6000U-A38DK-AJ6F	38	45	335	450	450	1500	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2500 (5500)	1920 (4224)	4420 (9724)	1682.7	1	1	917	1942	2	1.9	1834	3883
6000U-A42DK-AJ6F	42	50	373	500	500	1600	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2600 (5720)	1920 (4224)	4520 (9944)	1869.7	1	1	917	1942	2	1.9	1834	3883
6000U-A51DK-AJ6F	51	61	450	600	600	1700	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2700 (5940)	1920 (4224)	4620 (10164)	2243.6	1	1	917	1942	2	1.9	1834	3883
6000U-A59DK-AJ6F	59	70	522	700	700	1800	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2800 (6160)	1920 (4224)	4720 (10384)	2617.6	1	1	917	1942	2	1.9	1834	3883
6000U-A68DK-AJ6F	68	81	600	800	800	1900	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2900 (6380)	1920 (4224)	4820 (10604)	2991.5	1	1	917	1942	2	1.9	1834	3883
6000U-A76DK-AJ6F	76	91	670	900	900	2000	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3000 (6600)	1920 (4224)	4920 (10824)	3365.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A85DK-AJ6F	85	102	750	1000	1000	2100	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3100 (6820)	1920 (4224)	5020 (11044)	3739.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A93DK-AJ6F	93	111	820	1100	1100	2200	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3200 (7040)	1920 (4224)	5120 (11264)	4113.3	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A100DK-AJ6F	100	120	880	1180	1180	2300	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3300 (7260)	1920 (4224)	5220 (11484)	4412.5	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A106DK-AJ6F	106	127	933	1250	1250	2350	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3400 (7480)	1920 (4424)	5320 (11704)	4674.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A110DK-AJ6F	110	132	970	1300	1300	2500	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3550 (7810)	1920 (4224)	5470 (12034)	4861.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A128DK-AJ6F	128	153	1120	1500	1500	2600	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3650 (8030)	1920 (4224)	5570 (12254)	5609.1	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A139DK-AJ6F	139	166	1220	1635	1635	2800	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3850 (8470)	1920 (4224)	5770 (12694)	6113.9	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A148DK-AJ6F	148	177	1300	1750	1750	3000	150	STR_5	6-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4050 (8910)	1920 (4224)	5970 (13134)	6543.9	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A171DK-AJ6F	171	205	1500	2000	2000	3700	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4800 (10560)	1360 (2992)	6160 (13552)	7478.8	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A191DK-AJ6F	191	229	1680	2250	2250	3800	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4900 (10780)	1360 (2992)	6260 (13772)	8413.6	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A200DK-AJ6F	200	240	1753	2350	2350	3900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	5000 (11000)	1740 (3828)	6740 (14828)	8787.5	3	2.8	2750	5824	3	2.8	2750	5824

Table 42 - 6900V Input & 6300V AC Output (36 Pulse Configuration - 18 Power Cells)

Catalog Number	Motor Amps		Typical Motor Power Rating		Transformer Rating	Transformer Weight	Power Cell Rating	Structure Code	Number of Fans	Power Cell	Dimensions, mm (in.)										Weight, kg (lbs)			W1					W2			
											Width				Depth			Height						Requirement Total Air	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
	Cont.	1 Min.	kW	Hp	kVA	kg	Amps			HxWxD, mm (in.)	W1	W2a	W2b	W	D1	D2	D	H1	H2	H	M1	M2	M			m^3/s	L/s	cfm		m^3/s	L/s	cfm
6000U-A31DK-AJ6H	31	37	286	384	400	1400	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2400 (5280)	1920 (4224)	4320 (9504)	1495.8	1	1	917	1942	2	1.9	1834	3883
6000U-A35DK-AJ6H	35	42	320	429	450	1500	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2500 (5500)	1920 (4224)	4420 (9724)	1682.7	1	1	917	1942	2	1.9	1834	3883
6000U-A39DK-AJ6H	39	46	356	477	500	1600	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2600 (5720)	1920 (4224)	4520 (9944)	1869.7	1	1	917	1942	2	1.9	1834	3883
6000U-A47DK-AJ6H	47	56	430	576	600	1700	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2700 (5940)	1920 (4224)	4620 (10164)	2243.6	1	1	917	1942	2	1.9	1834	3883
6000U-A54DK-AJ6H	54	64	498	668	700	1800	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2800 (6160)	1920 (4224)	4720 (10384)	2617.6	1	1	917	1942	2	1.9	1834	3883
6000U-A62DK-AJ6H	62	74	573	768	800	1900	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2900 (6380)	1920 (4224)	4820 (10604)	2991.5	1	1	917	1942	2	1.9	1834	3883
6000U-A69DK-AJ6H	69	82	640	857	900	2000	75	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3000 (6600)	1920 (4224)	4920 (10824)	3365.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A78DK-AJ6H	78	93	716	960	1000	2100	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3100 (6820)	1920 (4224)	5020 (11044)	3739.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A85DK-AJ6H	85	102	783	1049	1100	2200	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3200 (7040)	1920 (4224)	5120 (11264)	4113.3	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A97DK-AJ6H	97	116	891	1194	1250	2350	100	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3400 (7480)	1920 (4424)	5320 (11704)	4674.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A100DK-AJ6H	100	120	926	1241	1300	2500	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3550 (7810)	1920 (4224)	5470 (12034)	4861.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A116DK-AJ6H	116	139	1069	1433	1500	2600	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3650 (8030)	1920 (4224)	5570 (12254)	5609.1	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A126DK-AJ6H	126	151	1165	1561	1635	2800	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3850 (8470)	1920 (4224)	5770 (12694)	6113.9	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A135DK-AJ6H	135	162	1241	1663	1750	3000	150	STR_5	6-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4050 (8910)	1920 (4224)	5970 (13134)	6543.9	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A155DK-AJ6H	155	186	1432	1919	2000	3700	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4800 (10560)	1360 (2992)	6160 (13552)	7478.8	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A174DK-AJ6H	174	208	1604	2150	2250	3800	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4900 (10780)	1360 (2992)	6260 (13772)	8413.6	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A182DK-AJ6H	182	218	1673	2243	2350	3900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	5000 (11000)	1740 (3828)	6740 (14828)	8787.5	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A200DK-AJ6H	200	240	1852	2482	2600	4900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	6000 (13200)	1740 (3828)	7740 (17028)	9722.4	3	2.8	2750	5824	3	2.8	2750	5824

Table 43 - 6900V Input & 6600V AC Output (36 Pulse Configuration - 18 Power Cells)

Catalog Number	Motor Amps		Typical Motor Power Rating		Transformer Rating	Transformer Weight	Power Cell Rating	Structure Code	Number of Fans	Power Cell	Dimensions, mm (in.)										Weight, kg (lbs)			W1					W2			
											Width				Depth			Height							Requirement Total Air	Number of Fans	Total Airflow			Number of Fans	Total Airflow		
	Cont.	1 Min.	kW	Hp	kVA	kg	Amps			HxWxD, mm (in.)	W1	W2a	W2b	W	D1	D2	D	H1	H2	H	M1	M2	M			m^3/s	L/s	cfm		m^3/s	L/s	cfm
6000U-A31DK-AJ6J	31	37	300	400	400	1400	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2400 (5280)	1920 (4224)	4320 (9504)	1495.8	1	1	917	1942	2	1.9	1834	3883
6000U-A35DK-AJ6J	35	42	335	450	450	1500	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2500 (5500)	1920 (4224)	4420 (9724)	1682.7	1	1	917	1942	2	1.9	1834	3883
6000U-A39DK-AJ6J	39	46	373	500	500	1600	40	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2600 (5720)	1920 (4224)	4520 (9944)	1869.7	1	1	917	1942	2	1.9	1834	3883
6000U-A47DK-AJ6J	47	56	450	600	600	1700	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2700 (5940)	1920 (4224)	4620 (10164)	2243.6	1	1	917	1942	2	1.9	1834	3883
6000U-A54DK-AJ6J	54	64	522	700	700	1800	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2800 (6160)	1920 (4224)	4720 (10384)	2617.6	1	1	917	1942	2	1.9	1834	3883
6000U-A62DK-AJ6J	62	74	600	800	800	1900	75	STR_1	3-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	2900 (6380)	1920 (4224)	4820 (10604)	2991.5	1	1	917	1942	2	1.9	1834	3883
6000U-A69DK-AJ6J	69	82	670	900	900	2000	75	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3000 (6600)	1920 (4224)	4920 (10824)	3365.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A78DK-AJ6J	78	93	750	1000	1000	2100	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3100 (6820)	1920 (4224)	5020 (11044)	3739.4	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A85DK-AJ6J	85	102	820	1100	1100	2200	100	STR_3	4-RH40	420x182x597 (16.53x7.16x23.5)	2000 (78.74)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3200 (7040)	1920 (4224)	5120 (11264)	4113.3	2	1.9	1834	3883	2	1.9	1834	3883
6000U-A97DK-AJ6J	97	116	933	1250	1250	2350	100	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4520 (177.95)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3400 (7480)	1920 (4424)	5320 (11704)	4674.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A100DK-AJ6J	100	120	970	1300	1300	2500	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3550 (7810)	1920 (4224)	5470 (12034)	4861.2	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A116DK-AJ6J	116	139	1120	1500	1500	2600	120	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3650 (8030)	1920 (4224)	5570 (12254)	5609.1	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A126DK-AJ6J	126	151	1220	1635	1635	2800	150	STR_4	5-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	3850 (8470)	1920 (4224)	5770 (12694)	6113.9	2	1.9	1834	3883	3	2.8	2750	5824
6000U-A135DK-AJ6Jj	135	162	1300	1750	1750	3000	150	STR_5	6-RH40	420x182x597 (16.53x7.16x23.5)	2200 (86.61)	1720 (67.72)	600 (23.62)	4320 (170.08)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4050 (8910)	1920 (4224)	5970 (13134)	6543.9	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A155DK-AJ6J	155	186	1500	2000	2000	3700	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4800 (10560)	1360 (2992)	6160 (13552)	7478.8	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A174DK-AJ6J	174	208	1680	2250	2250	3800	180	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	4900 (10780)	1360 (2992)	6260 (13772)	8413.6	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A182DK-AJ6J	182	218	1753	2350	2350	3900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	5000 (11000)	1740 (3828)	6740 (14828)	8787.5	3	2.8	2750	5824	3	2.8	2750	5824
6000U-A200DK-AJ6J	200	240	1940	2600	2600	4900	200	STR_2	6-RH40	420x262x619 (16.53x10.31x24.37)	2400 (94.49)	2200 (86.61)	600 (23.62)	5200 (204.72)	1300 (51.18)	62 (2.44)	1362 (53.6)	2300 (90.55)	340 (13.4)	2640 (103.94)	6000 (13200)	1740 (3828)	7740 (17028)	9722.4	3	2.8	2750	5824	3	2.8	2750	5824

Table 44 - 2400V Input & 2300/2400V AC Output (18 Pulse Configuration - 9 Power Cells)

Motor Amps		Typical Motor Power Rating		Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Hp	kVA	W	D	H	
39...134	46...240	137...470	184...629	250...700	3550	1362	2680	STR_9
155...200	186...240	545...702	730...941	800...1000	3790	1362	2640	STR_10

Table 45 - 4160V Input & 4000/4160V AC Output (24 Pulse Configuration - 12 Power Cells)

Motor Amps		Typical Motor Power Rating		Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Hp	kVA	W	D	H	
37...99	44...118	225...600	300...800	300...800	3790	1362	2640	STR_6
110...145	132...174	670...880	900...1180	900...1180	3790	1362	2640	STR_7
153...200	183...240	933...1220	1250...1635	1250...1635	4380	1362	2640	STR_8

Table 46 - 6600V Input & 6000V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor Amps		Typical Motor Power Rating		Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Hp	kVA	W	D	H	
34...148	40...177	300...1300	400...1750	400...1750	4320	1362	2640	STR_1
171...200	205...240	1500...1753	2000...2350	2000...2350	5200	1362	2640	STR_2

Table 47 - 6600V Input & 6300V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor Amps		Typical Motor Power Rating		Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Hp	kVA	W	D	H	
31...135	37...162	286...1241	384...1663	400...1750	4320	1362	2640	STR_1
155...200	186...240	1432...1852	1919...2482	2000...2600	5200	1362	2640	STR_2

Table 48 - 6600V Input & 6600V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor Amps		Typical Motor Power Rating		Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Hp	kVA	W	D	H	
31...135	37...162	300...1300	400...1750	400...1750	4320	1362	2640	STR_1
155...200	186...240	1500...1940	2000...2600	2000...2600	5200	1362	2640	STR_2

Table 49 - 6900V Input & 6000V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor Amps		Typical Motor Power Rating		Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Hp	kVA	W	D	H	
34...139	40...240	300...1220	400...1635	400...1635	4320	1362	2640	STR_1
148	177	1300	1750	1750	4520	1362	2640	STR_2
171...200	205...240	1500...1753	2000...2350	2000...2350	5200	1362	2640	STR_2

Table 50 - 6900V Input & 6300V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor Amps		Typical Motor Power Rating		Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Hp	kVA	W	D	H	
31...85	37...102	286...783	384...1049	400...1100	4320	1362	2640	STR_1
97...135	116...162	891...1241	1194...1663	1250...1750	4520	1362	2640	STR_4
155...200	186...240	1432...1852	1919...2482	2000...2600	5200	1362	2640	STR_2

Table 51 - 6900V Input & 6600V AC Output (36 Pulse Configuration - 18 Power Cells)

Motor Amps		Typical Motor Power Rating		Transformer Rating	Width	Depth	Height	Structure Code
Cont.	1 Min.	kW	Hp	kVA	W	D	H	
31...85	37...102	300...820	400...1100	400...1100	4320	1362	2640	STR_1
97...135	116...162	933...1300	1250...1750	1250...1750	4520	1362	2640	STR_4
155...200	186...240	1500.1940	2000...2600	2000...2600	5200	1362	2640	STR_2

Notes:

PowerFlex 6000 Bypass Cabinet Dimensions and Weights (For IEC only)

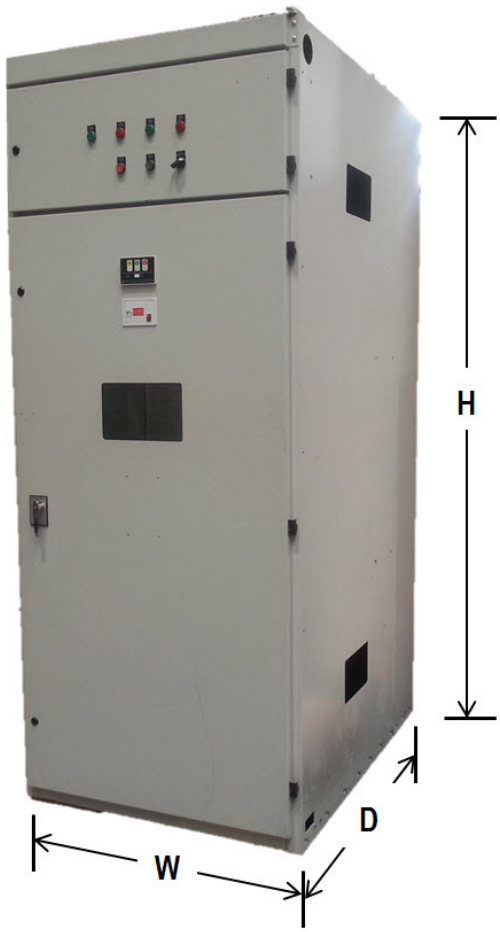


Table 52 - 3000V AC Input — PowerFlex 6012DB bypass cabinets

AAA Output Amps	Typical Motor Power Rating		Automatic Bypass – Version 1				Automatic Bypass – Version 2				Manual Bypass			
Cont. Range	kW Range	Hp Range	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)
			Width	Depth	Height		Width	Depth	Height		Width	Depth	Height	
80...200	315...800	422...1072	800	1300	2400	550	900	1300	2400	720	900	1300	2400	500
201...380	801...1600	1073...2144	800	1300	2400	550	900	1300	2400	720	900	1300	2400	500

Table 53 - 3300V AC Input — PowerFlex 6012DB bypass cabinets

AAA Output Amps	Typical Motor Power Rating		Automatic Bypass – Version 1				Automatic Bypass – Version 2				Manual Bypass			
Cont. Range	kW Range	Hp Range	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)
			Width	Depth	Height		Width	Depth	Height		Width	Depth	Height	
80...200	315...800	422...1072	800	1300	2400	550	900	1300	2400	720	900	1300	2400	550
201...380	801...1600	1073...2144	800	1300	2400	550	900	1300	2400	720	900	1300	2400	550

Table 54 - 6000V AC Input — PowerFlex 6012DB bypass cabinets

AAA Output Amps	Typical Motor Power Rating		Automatic Bypass – Version 1				Automatic Bypass – Version 2				Manual Bypass			
Cont. Range	kW Range	Hp Range	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)
			Width	Depth	Height		Width	Depth	Height		Width	Depth	Height	
25...200	200...1600	268...2144	800	1300	2400	550	900	1300	2400	720	900	1300	2400	550
201...420	1601...3450	2145...4624	800	1300	2400	550	900	1300	2400	720	900	1300	2400	550

Table 55 - 6600V AC Input — PowerFlex 6012DB bypass cabinets

AAA Output Amps	Typical Motor Power Rating		Automatic Bypass – Version 1				Automatic Bypass – Version 2				Manual Bypass			
Cont. Range	kW Range	Hp Range	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)
			Width	Depth	Height		Width	Depth	Height		Width	Depth	Height	
25...200	200...1600	268...2144	800	1300	2400	550	900	1300	2400	720	900	1300	2400	550
201...420	1601...3450	2145...4624	800	1300	2400	550	900	1300	2400	720	900	1300	2400	550

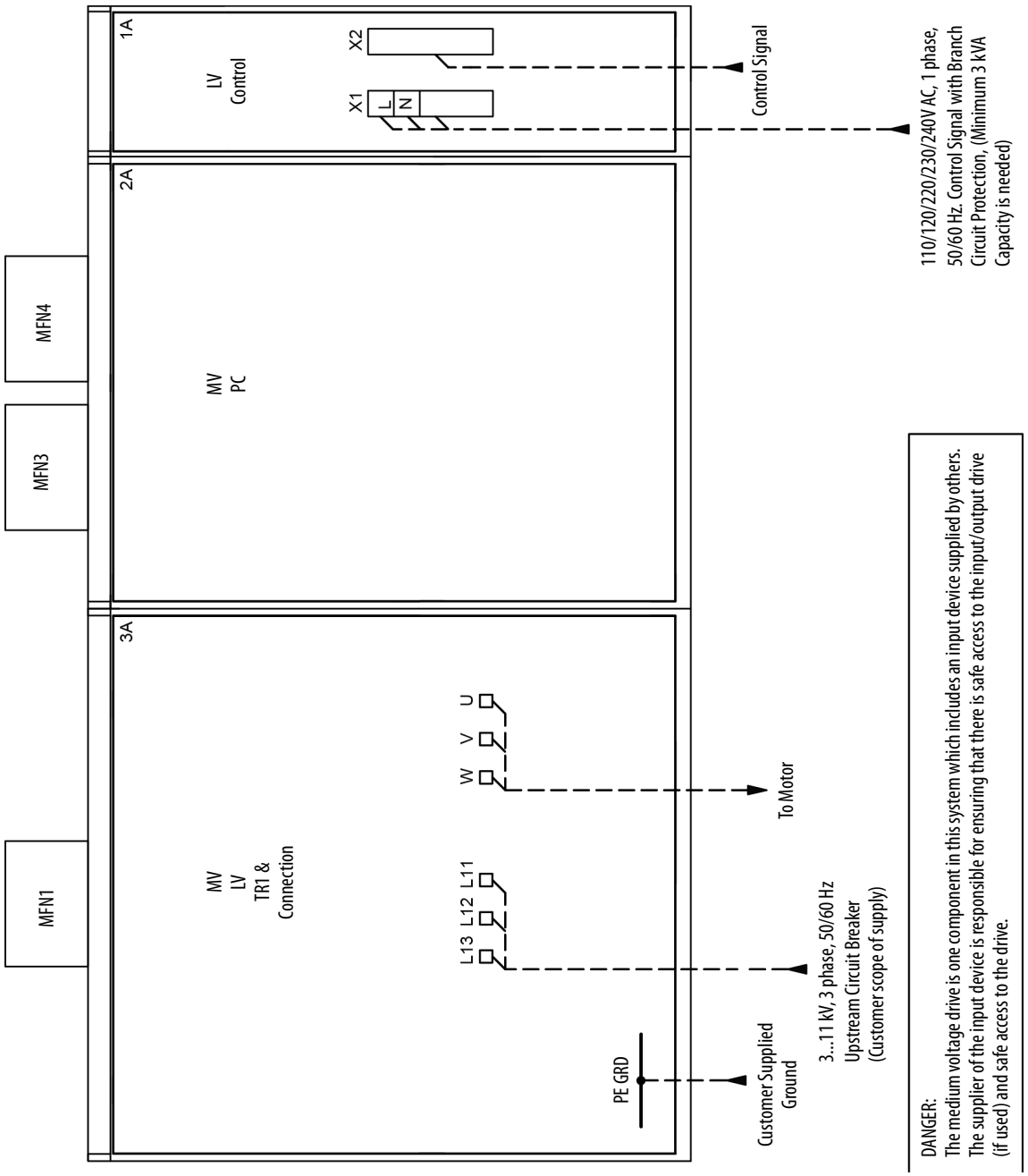
Table 56 - 10,000V AC Input — PowerFlex 6012DB bypass cabinets

AAA Output Amps	Typical Motor Power Rating		Automatic Bypass – Version 1				Automatic Bypass – Version 2				Manual Bypass			
Cont. Range	kW Range	Hp Range	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)	Dimensions (mm)			Weight (kg)
			Width	Depth	Height		Width	Depth	Height		Width	Depth	Height	
15...200	200...2800	268...3753	800	1300	2400	550	900	1300	2400	720	900	1300	2400	550
201...420	2801...5600	3754...7506	800	1300	2400	550	900	1300	2400	720	900	1300	2400	550

Power Cabling and Control Signal Wiring Details (For IEC)

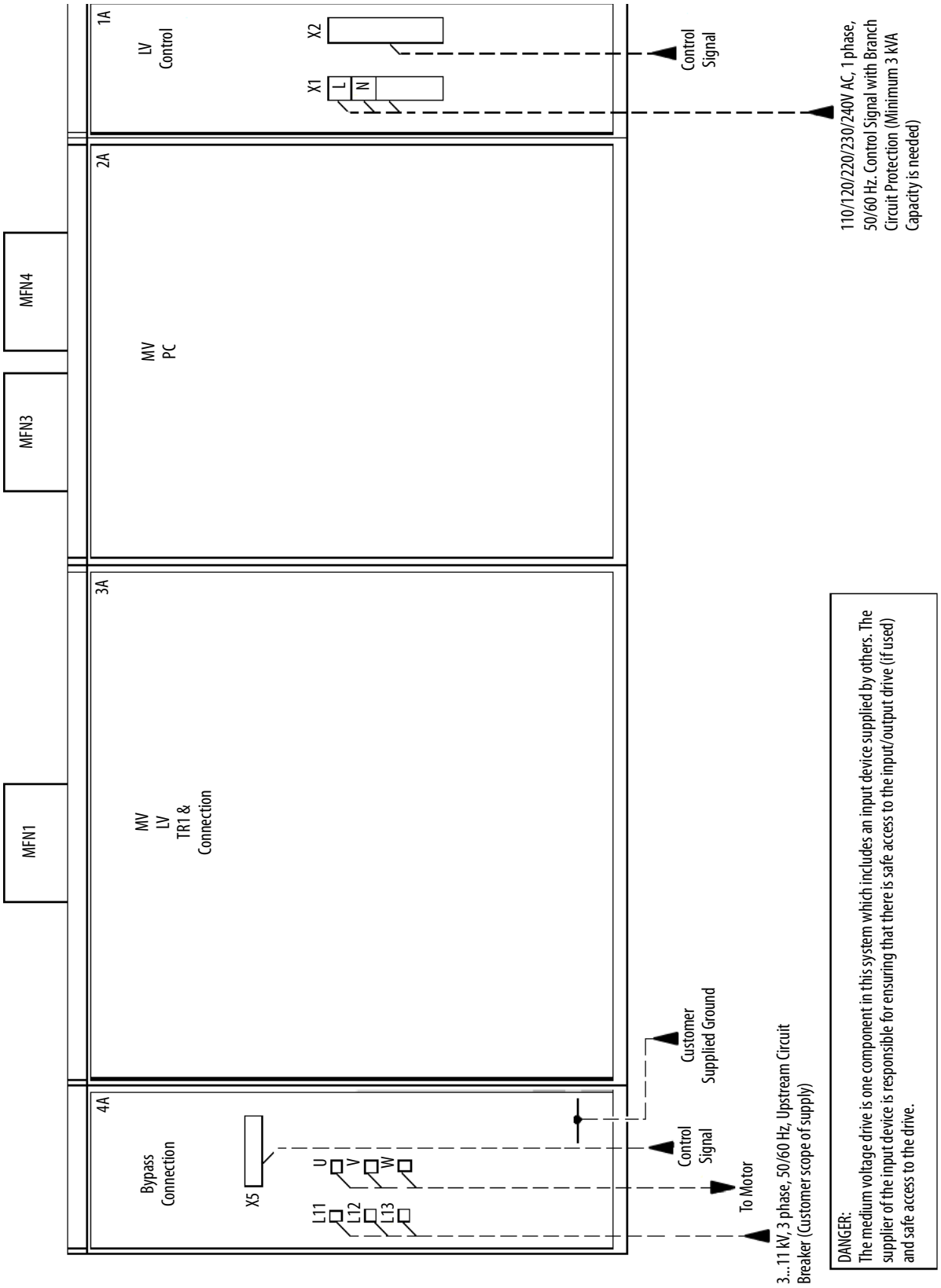
Schematic Diagrams

Figure 83 - Schematic Diagram of the Drive System without a Bypass Cabinet(1)



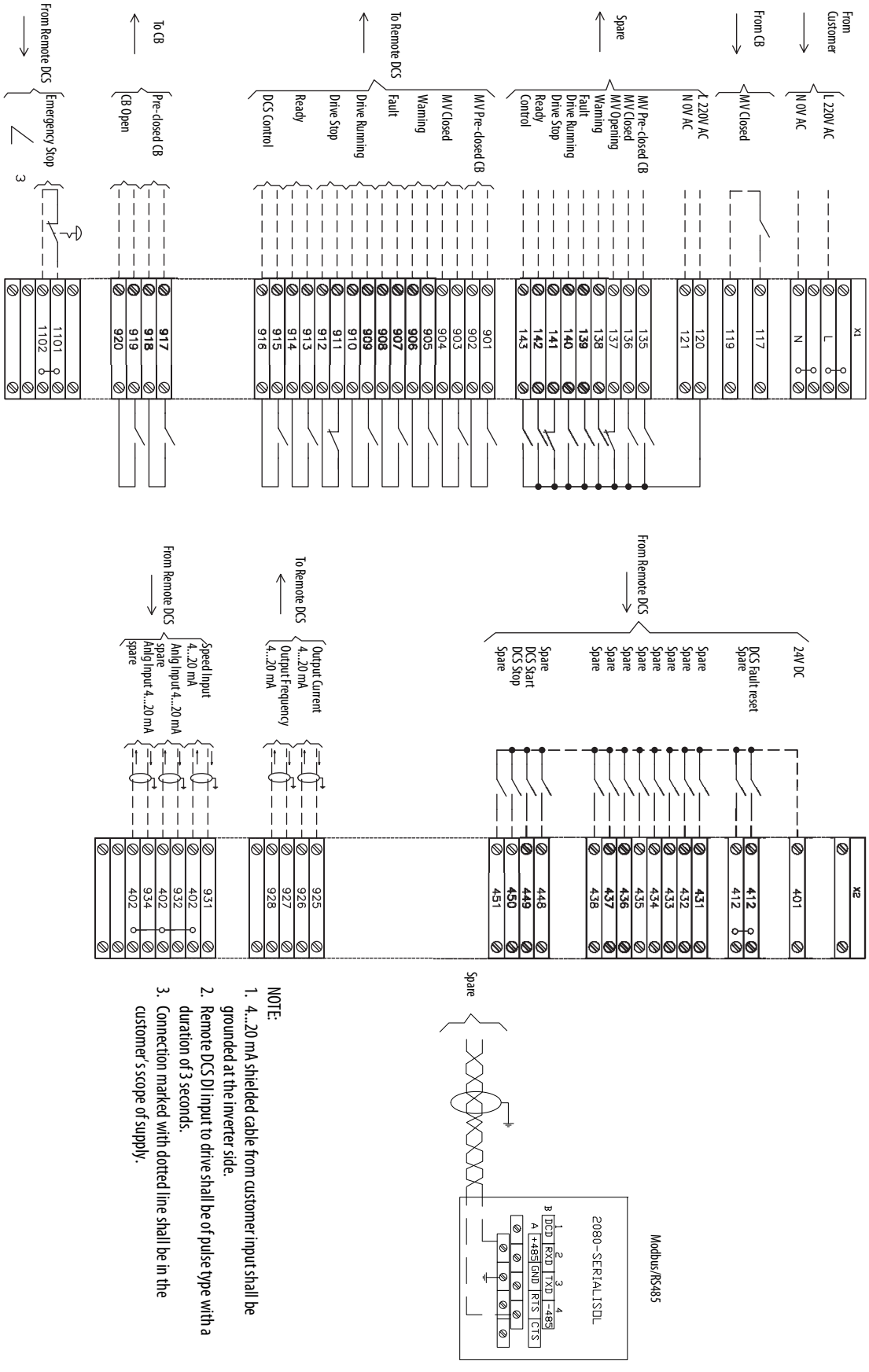
(1) Wiring locations are for design reference only; actual wiring must comply with the drawings provided with the drive.

Figure 84 - Schematic Diagram of the Drive System with a Bypass Cabinet(1)



(1) Wiring locations are for design reference only; actual wiring must comply with the drawings provided with the drive.

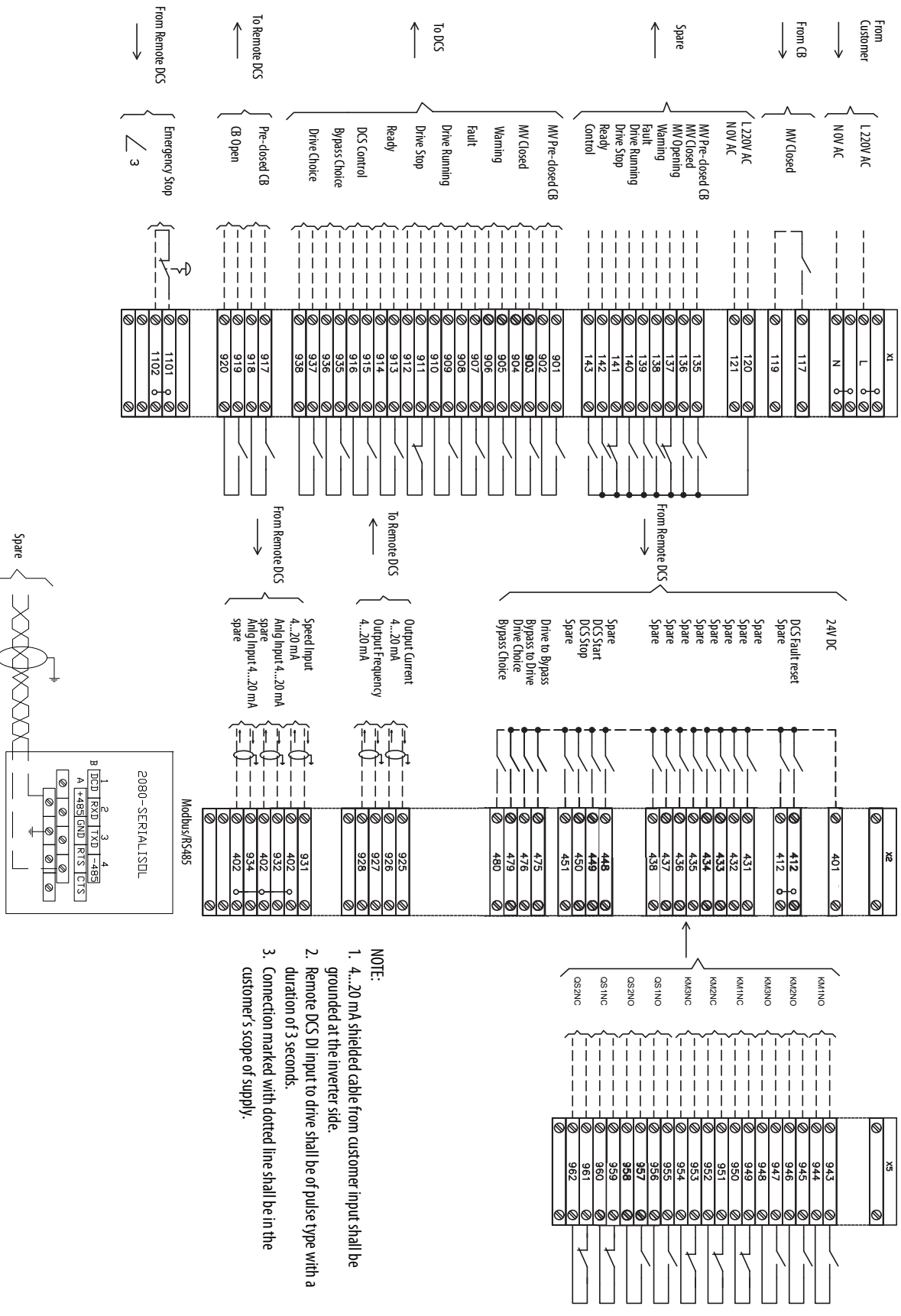
Figure 85 - Terminal Strip Wiring Diagram for Drive System without a Bypass Cabinet



NOTE:

1. 4...20 mA shielded cable from customer input shall be grounded at the inverter side.
2. Remote DCS DI input to drive shall be of pulse type with a duration of 3 seconds.
3. Connection marked with dotted line shall be in the customer's scope of supply.

Figure 86 - Typical Terminal Strip Wiring Diagram Drive System with a Bypass Cabinet



NOTE:

1. 4...20 mA shielded cable from customer input shall be grounded at the inverter side.
2. Remote DCS DI input to drive shall be of pulse type with a duration of 3 seconds.
3. Connection marked with dotted line shall be in the customer's scope of supply.

Standard Input/Output Connection Points

Table 57 - I/O Connections related to High Voltage Cabinet

Serial Number	Name of I/O Connection	AI	AO	DI	DO	Note
1	Input circuit breaker closing node is allowed (917, 918)				1	Serially connected into the input circuit breaker's closing circuit (the VFD provides passive normally open points, valid when closed)
2	Trip connection points within the VFD (919, 920)				1	Can be connected into input circuit breaker's closing circuit in parallel (the VFD provides passive normally open points, valid when closed)
3	Input circuit breaker already closed connection point (117, 119)			1		Circuit breaker's auxiliary normally open connection points (valid when closed)

Table 58 - I/O Connections related to Remote Distributed Control System

Serial Number	Name of I/O Connection	AI	AO	DI	DO	Note
1	VFD speed regulation command (931, 402)	1				User-provided 4...20mA
	Spare (932, 402)	1				User-provided 4...20 mA (spare)
	Spare (934, 402)	1				User-provided 4...20 mA (spare)
	Spare	1				User-provided 4...20 mA (spare)
2	VFD speed feedback signal (927, 928)		1			VFD-provided 4...20mA
3	VFD current feedback signal (925, 926)		1			VFD-provided 4...20mA
4	Alternate start command signal (431, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Remote DCS start command signal (449, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
5	Alternate stop command signal (432, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Remote DCS stop command signal (450, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
6	Spare (433, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
7	Spare (434, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
8	Spare (435, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (436, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (437, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (438, 401)			1		User-provided normally open passive dry contact (switch quantity)
9	Remote DCS alternate (448, 401)			1		User-provided normally open passive dry contact (switch quantity)
10	Remote DCS fault reset command (412, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Alternate reset command (412, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
11	Emergency stop button command (1101, 1102)			1		User-provided normally closed passive dry contact (voltage class higher than 220V AC, 5 A, switch quantity)
12	VFD allow closing indication (901, 902)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5 A) (used for Remote DCS)
	Circuit breaker closing indication (903, 904)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)

Table 58 - I/O Connections related to Remote Distributed Control System (Continued)

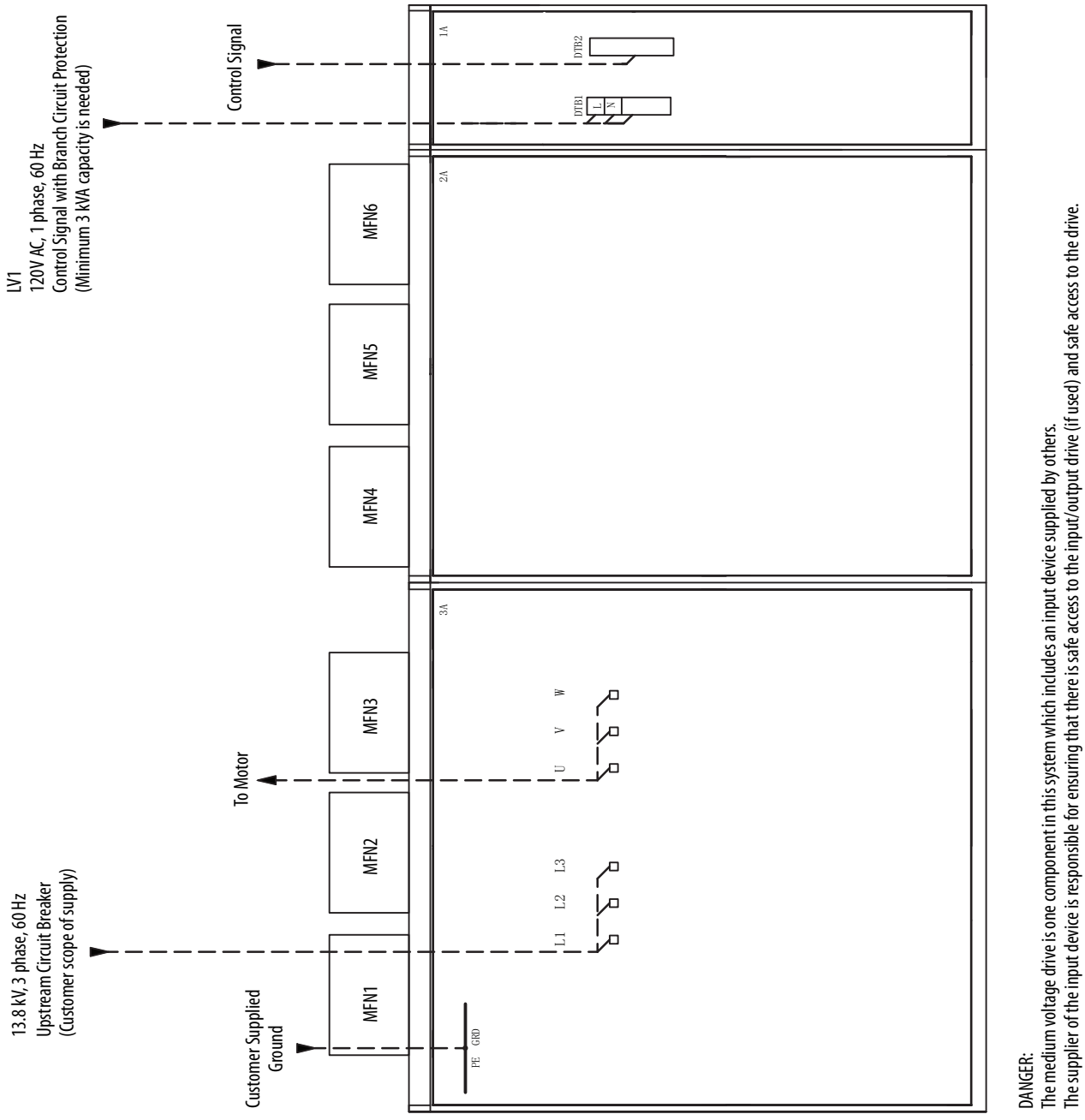
Serial Number	Name of I/O Connection	AI	AO	DI	DO	Note
	VFD alarm indication (905, 906)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD fault indication (907, 908)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD operation indication (909, 910)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD stop indication (911, 912)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD ready indication (913, 914)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	Remote DCS control indication (915, 916)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
13	VFD allow closing indication (135, 121)				1	VFD-provided normally closed active dry contact (voltage class ≤220V AC, 5A) (spare)
	Input circuit breaker closing indication (136, 121)				1	VFD-provided normally closed active dry contact (voltage class ≤220V AC, 5A) (spare)
	Input circuit breaker opening indication (137, 121)				1	VFD-provided normally closed active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD alarm indication (138, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD fault indication (139, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD operation indication (140, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD stop indication (141, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	VFD ready indication (142, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	Spare (143, 121)				1	VFD-provided normally open active dry contact (voltage class ≤220V AC, 5A) (spare)
	Spare (120, 121)				1	VFD-provided 220V AC (load ≤10 W, spare)

All of the AI/AO, DI/DO connection points are expandable based on user requirements.

Power Cabling and Control Signal Wiring Details (For UL)

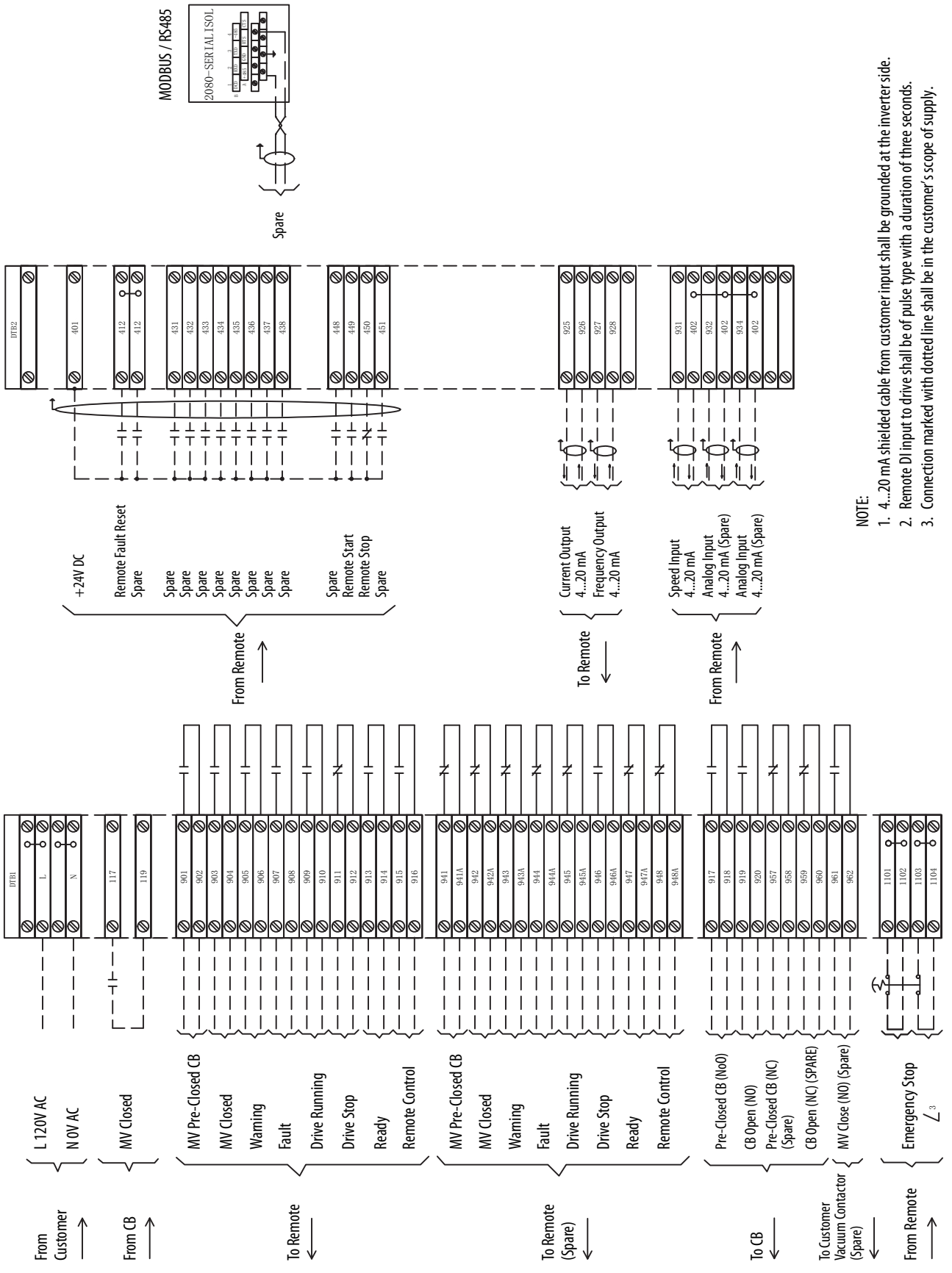
Schematic Diagrams

Figure 87 - Schematic Diagram of the Drive System without a Bypass Cabinet(1)



(1) Wiring locations are for design reference only; actual wiring must comply with the drawings provided with the drive.

Figure 88 - Terminal Strip Wiring Diagram for Drive System without a Bypass Cabinet



Standard Input/Output Connection Points

Table 59 - I/O Connections related to High Voltage Cabinet

Serial Number	Name of I/O Connection	AI	AO	DI	DO	Note
1	Input circuit breaker closing node is allowed (917, 918)				1	Serially connected into the input circuit breaker's closing circuit (the VFD provides passive normally open points, valid when closed)
	Input circuit breaker closing node is allowed (957, 958) (spare)				1	Serially connected into the input circuit breaker's closing circuit (the VFD provides passive normally open points, valid when closed)
2	Trip connection points within the VFD (919, 920)				1	Can be connected into input circuit breaker's closing circuit in parallel (the VFD provides passive normally open points, valid when closed)
	Trip connection points within the VFD (959, 960) (spare)				1	Can be connected into input circuit breaker's closing circuit in parallel (the VFD provides passive normally open points, valid when closed)
3	Input circuit breaker already closed connection point (117, 119)			1		Circuit breaker's auxiliary normally open connection points (valid when closed)
4	Input vacuum contactor closing (961, 962) (spare)				1	Serially connected into the vacuum contactor closing (the VFD provides passive normally open points, valid when closed)

Table 60 - I/O Connections related to Remote Distributed Control System

Serial Number	Name of I/O Connection	AI	AO	DI	DO	Note
1	VFD speed regulation command (931, 402)	1				User-provided 4...20mA
	Spare (932, 402)	1				User-provided 4...20 mA (spare)
	Spare (934, 402)	1				User-provided 4...20 mA (spare)
2	VFD speed feedback signal (927, 928)		1			VFD-provided 4...20mA
3	VFD current feedback signal (925, 926)		1			VFD-provided 4...20mA
4	Alternate start command signal (431, 401) (spare)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Remote DCS start command signal (449, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
	Alternate command signal (432, 401) (spare)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
5	Remote DCS stop command signal (450, 401)			1		User-provided normally closed passive dry contact (pulsed quantity, valid with 3S)
6	Spare (433, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
7	Spare (434, 401)			1		User-provided normally open passive dry contact (pulsed quantity, valid with 3S)
8	Spare (435, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (436, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (437, 401)			1		User-provided normally open passive dry contact (switch quantity)
	Spare (438, 401)			1		User-provided normally open passive dry contact (switch quantity)
9	Remote DCS alternate (448, 401)			1		User-provided normally open passive dry contact (switch quantity)
10	Remote DCS fault reset command (412, 401)			1		User-provided normally open passive dry contact
	Alternate reset command (412, 401)			1		User-provided normally open passive dry contact
11	Emergency stop button command (1101, 1102)			1		User-provided normally closed passive dry contact (voltage class higher than 220V AC, 5 A, switch quantity)

Table 60 - I/O Connections related to Remote Distributed Control System (Continued)

Serial Number	Name of I/O Connection	AI	AO	DI	DO	Note
	Emergency stop button command (1103, 1104)			1		User-provided normally closed passive dry contact (voltage class higher than 220V AC, 5 A, switch quantity)
12	VFD allow closing indication (901, 902)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5 A) (used for Remote DCS)
	Circuit breaker closing indication (903, 904)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD alarm indication (905, 906)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD fault indication (907, 908)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD operation indication (909, 910)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD stop indication (911, 912)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD ready indication (913, 914)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	Remote control indication (915, 916)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
13	VFD allow closing indication (941, 941A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	Circuit breaker closing indication (942, 942A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD alarm indication (943, 943A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD fault indication (944, 944A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD operation indication (945, 945A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD stop indication (946, 946A)				1	VFD-provided normally open passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	VFD ready indication (947, 947A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)
	Remote control indication (948, 948A)				1	VFD-provided normally closed passive dry contact (voltage class ≤220V AC, 5A) (used for Remote DCS)

Line and Load Cable Sizes

The data in the following tables are informative only; do not base final design criteria solely on this data. Follow national and local installation codes, industry best practices, and cable manufacturer recommendations. As cabling methods can very widely, maximum cables sizes do not account for the size of the conduit hub.

Table 61 - Line and Load Cable Sizes for IEC

	Description (Motor V/Freq.)	Drive Enclosure Opening mm (in.)	Max. Size & No. Incoming Cables: IEC(1) (2) (3)
Maximum Line Cable Sizes	3000 V, 50/60 Hz	110 (4.33)	300 mm^2 5 kV or 240 mm^2 8 kV/phase
	3300 V, 50/60 Hz	110 (4.33)	300 mm^2 5 kV or 240 mm^2 8 kV/phase
	6000 V, 50/60 Hz	110 (4.33)	240 mm^2 8 kV or 185mm^2 15 kV/phase
	6600 V, 50/60 Hz	110 (4.33)	240 mm^2 8 kV or 185mm^2 15 kV/phase
	10,000 V, 50/60 Hz	110 (4.33)	185 mm^2 15 kV/phase
Maximum Load Cable Sizes	3000 V, 50/60 Hz	110 (4.33)	300 mm^2 5 kV or 240 mm^2 8 kV/phase
	3300 V, 50/60 Hz	110 (4.33)	300 mm^2 5 kV or 240 mm^2 8 kV/phase
	6000 V, 50/60 Hz	110 (4.33)	240 mm^2 8 kV or 185mm^2 15 kV/phase
	6600 V, 50/60 Hz	110 (4.33)	240 mm^2 8 kV or 185mm^2 15 kV/phase
	10,000 V, 50/60 Hz	110 (4.33)	185 mm^2 15 kV/phase

(1) Cable sizes are based on overall dimensions of compact-stranded three-conductor shielded cable (common for industrial cable tray installations). Maximum sizing stated accounts for minimum rated cable insulation requirements and the next higher-rated cable (i.e., 8 kV is not commercially available in many areas of the world, therefore Rockwell Automation provides an 8 kV (minimum rating) as well as a 15 kV rating, when applicable. Enclosure openings will accommodate the thicker insulation on the higher-rated cable. IEC ratings show the equivalent to the NEMA sizes. The exact cable mm^2 size shown is not commercially available in many cases; use the next smaller standard size.

(2) Minimum cable bend radius recommendations vary by national codes, cable type, and cable size. Consult local codes for guidelines and requirements. General relationship of cable diameter to bend radius is typically between 7x...12x (e.g., if the cable diameter is 1 in. [2.54 cm] the minimum bend radius could range between 7...12 in. [18.8...30.48 cm]).

(3) As cabling methods can vary widely, maximum cable sizes shown do not account for the size of the conduit hub. Verify size of conduit hub(s) against the "Drive enclosure openings" shown.

Table 62 - Line and Load Cable Sizes for UL

	Description (Motor V/Freq.)	Drive Enclosure Opening mm (in.)	Max. Size & No. Incoming Cables: UL(1) (2) (3)
Maximum Line Cable Sizes	2300/2400 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	300 mm^2 (600 AWG) 5 kV or 240 mm^2 (500 AWG) 8 kV/phase
	4000/4160 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	300 mm^2 (600 AWG) 5 kV or 240 mm^2 (500 AWG) 8 kV/phase
	6000 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm^2 (500 AWG) 8 kV or 185 mm^2 (350 AWG)15 kV/phase
	6300 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm^2 (500 AWG) 8 kV or 185 mm^2 (350 AWG)15 kV/phase
	6600 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm^2 (500 AWG) 8 kV or 185 mm^2 (350 AWG)15 kV/phase
Maximum Load Cable Sizes	2300/2400 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	300 mm^2 (600 AWG) 5 kV or 240 mm^2 (500 AWG) 8 kV/phase
	4000/4160 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	300 mm^2 (600 AWG) 5 kV or 240 mm^2 (500 AWG) 8 kV/phase
	6000 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm^2 (500 AWG) 8 kV or 185 mm^2 (350 AWG)15 kV/phase
	6300 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm^2 (500 AWG) 8 kV or 185 mm^2 (350 AWG)15 kV/phase
	6600 V, 50/60 Hz	1150 x 200 (45.3 x 7.9)	240 mm^2 (500 AWG) 8 kV or 185 mm^2 (350 AWG)15 kV/phase

(1) Cable sizes are based on overall dimensions of compact-stranded three-conductor shielded cable (common for industrial cable tray installations). Maximum sizing stated accounts for minimum rated cable insulation requirements and the next higher-rated cable (i.e., 8 kV is not commercially available in many areas of the world, therefore Rockwell Automation provides an 8 kV (minimum rating) as well as a 15 kV rating, when applicable. Enclosure openings will accommodate the thicker insulation on the higher-rated cable. IEC ratings show the equivalent to the NEMA sizes. The exact cable mm^2 size shown is not commercially available in many cases; use the next smaller standard size.

(2) Minimum cable bend radius recommendations vary by national codes, cable type, and cable size. Consult local codes for guidelines and requirements. General relationship of cable diameter to bend radius is typically between 7x...12x (e.g., if the cable diameter is 1 in. [2.54 cm] the minimum bend radius could range between 7...12 in. [18.8...30.48 cm]).

(3) As cabling methods can vary widely, maximum cable sizes shown do not account for the size of the conduit hub. Verify size of conduit hub(s) against the “Drive enclosure openings” shown.

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Notes:

Rockwell Automation Support

Rockwell Automation provides technical information on the Web to assist you in using its products. At http://www.rockwellautomation.com/support you can find technical and application notes, sample code, and links to software service packs. You can also visit our Support Center at https://rockwellautomation.custhelp.com/ for software updates, support chats and forums, technical information, FAQs, and to sign up for product notification updates.

In addition, we offer multiple support programs for installation, configuration, and troubleshooting. For more information, contact your local distributor or Rockwell Automation representative, or visit http://www.rockwellautomation.com/services/online-phone.

Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/rockwellautomation/support/overview.page, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to help ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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